

THE IRON TRADE REVIEW

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Bessemer Bought by an Important Consumer

And Inquiry Pending for 50,000 Tons Additional—Heavy Bookings Result in Slower Deliveries from Mills—Labor Shortage

Gradual extension of the time in which mills can make deliveries on finished products is strong evidence of the large amount of business recently booked. One important manufacturer of plates is naming 90 days as the time for delivery and numerous manufacturers of bars are asking from four to nine weeks. This delay in making deliveries from mills has resulted in marked improvement in warehouse business and some jobbers have advanced their quotations from \$1 to \$2 per ton. Shortage of labor, especially of the common grade, is becoming an increasingly important factor. It is estimated that 3,000 more laborers are needed in the Connellsville district. Blast furnace and rolling mill operators are also complaining of not being able to get enough men. Some mills are operating single turn for this reason.

Blast Furnace Production

The production of coke and anthracite pig iron for April was 2,377,494 tons, a decrease of 34,035 tons, but as April had one less day than March, the average daily production for April was 79,250 tons, an increase of 1,459 tons over March. The rate of production is now the greatest since April, 1910. Production of non-merchant stacks decreased only 42 tons, while merchant stacks decreased 33,723 tons. There was a net gain of two in furnaces in operation. Eight or ten furnaces are ready to blow in, but there is considerable uncertainty as to whether they will be able to cover for their coke requirements.

Pig Iron

Following the recent heavy buying of pig iron, reports of sales of large tonnages are not so numerous. For example, one Cleveland firm, which during April sold 158,000 tons, states that present demand is not so active, but the aggregate of small sales in northern Ohio makes a very respectable total. Sales at Chicago have included about 4,500 tons of malleable and 7,500 tons of that grade are pending. In Pittsburgh a sale of 9,000 tons of basic was made to an eastern consumer by a non-valley stack at \$13.25, furnace, equivalent to \$13, valley, which seems to be the pretty well established price for basic in the valley. An inquiry for 25,000 tons of basic for third-quarter delivery is

pending at Pittsburgh. A leading eastern steel maker has purchased about 10,000 tons of basic for delivery into second and third quarters at \$15, delivered, or \$14.40, furnace. This sale indicates the price of basic for this delivery, concerning which there has been considerable doubt. For third quarter, sales of eastern No. 2X have been made at \$15.35, delivered, and generally prices do not fall below \$15 for last half delivery. Virginia foundry grades are strong and Alabama iron is now quotable at \$11, Birmingham, for No. 2 foundry for spot shipment, and \$11 to \$11.50 for the last half of the year.

A large manufacturer has bought 15,000 tons of Bessemer pig iron at \$14.50, valley, for June and July delivery, and is inquiring for about 50,000 tons additional. The same company has also taken 8,000 tons of open-hearth billets. The billet purchase reflects the shortage of open-hearth steel. Steel works are unable to keep up with the demand from the finishing mills.

Finished Material

The April production of mills in the eastern territory was the best of the year. Mill activities throughout the country are being well maintained, except where labor shortage prevents. Prices in some finished lines are being shaded about \$1 per ton in the east, while in other sections of the country shading is rarely heard of. The ingot production of the United States Steel Corporation for April exceeded 1,400,000 tons, or at the rate of over 17,000,000 tons annually. The April output is about 50,000 tons below the record month of March, 1910, which had one more operating day. The daily rate of output at present, which in all probability will be maintained for some time, will probably make a new record this month. The April pig iron output of the Corporation was close to the high mark.

Bar Iron

Improvement is reported in the bar iron market at Chicago, where orders at 1.25c are becoming more common. Some mills, however, are still willing to sell at 1.17½c at their plants. This is particularly true in territory tributary to St. Louis and Cincinnati. Cleveland mills have declined to quote less than 1.20c. There is improved demand for hard steel. Specifications for soft steel bars are heavy and four weeks is about the best delivery obtainable anywhere in the central west.

PITTSBURGH

Labor Shortage an Important Factor

Office of THE IRON TRADE REVIEW.
2148-49 Oliver Bldg., May 7

Renewed activity in the pig iron market and much quiet buying stimulated prices to some extent the past week and the market held firmly against repeated efforts to depress values by important buyers. The negotiations for last half coke contracts thus far indicate that from 90 cents to \$1 higher prices will be paid for fuel than was the case for the first six months, thus influencing iron prices sharply. There is a growing scarcity in semi-finished steel, a heavy buying of plates and shapes, and sheet mills are making new records in production and shipment with the close of April. Scarcity of labor not only in the coke regions, but throughout the Pittsburgh district has become a disturbing factor in the iron and steel trade. There has been much activity in the buying of scrap and consumption is increasing. Producers are falling further behind on deliveries in most finished lines. Many are sold up to July 1 and are unable to take on more tonnage.

Pig Iron.—The scarcity of labor throughout the Pittsburgh district, extending into the valleys, has been severely felt by blast furnace interests, and in some instances, it has affected production. The demand for pig iron at the same time has been quite active, and while there has been a tendency upward in prices, the market as a whole remains unchanged. There has been among the larger sales of the week, one of 9,000 tons of basic iron for an eastern consumer, which was closed at \$13.25, furnace, which being a non-valley stack, brings the price to about \$13. An inquiry is also at hand for 20,000 tons of basic for third quarter delivery, and the lowest price quoted was \$13. Bessemer iron is slightly more active, a sale of 2,500 tons for third quarter delivery being made at \$14.25, valley. A number of small inquiries for lots of 500 to 1,000 tons, aggregating some 8,000 to 10,000, are also pending, and some of these were closed at \$14.25, valley. Both basic and Bessemer iron are fairly well sold up, and producers are in a comfortable position for some time ahead. No. 2 foundry iron has been somewhat quiet, and the price has shown a softening tendency for the last half quotations. A week ago, furnaces were asking \$13.75 for the last quarter of the year, and \$13.50 for the third quarter,

while \$13.25 has been uniformly asked for prompt shipment. The prompt iron is still holding firm at \$13.25, but quotations are now being made more freely for the last half at \$13.50. A thousand tons of gray forge iron was sold at \$13, and inquiries are numerous for small tonnages. Low phosphorus grades generally are in demand. One inquiry, calling for 500 tons, has not been placed. Malleable iron is fairly active, and while many sales have been made at \$13.25, valley, a lot of 3,000 tons was closed this week at \$13, but under special conditions, and of special analysis. We quote the market as follows:

(Prompt Shipment.)	
Bessemer, valley	\$14.25
Bessemer, Pittsburgh	15.15
Basic, valley	13.00
Basic, Pittsburgh	13.90
No. 2 foundry, Pittsburgh	14.40
Gray forge, Pittsburgh	13.90
Malleable, Pittsburgh	14.10

(Third Quarter.)	
Bessemer, valley	\$14.25
Bessemer, Pittsburgh	15.15
Basic, Pittsburgh	14.15
No. 2 foundry, Pittsburgh	14.40
Gray forge, Pittsburgh	14.00
Malleable, Pittsburgh	14.15

Ferro-Alloys.—The demand for ferro-alloys is slightly more active, and inquiries are more numerous, but sales are confined to small lots of less than 100 tons. Such sales as are for prompt shipment are at \$50, Baltimore, and orders for forward deliveries are being accepted at \$46, Baltimore. Makers abroad are reporting their stocks very low, and the market has a generally sold-up appearance. Fifty per cent ferro-silicon is in fair demand, and prices are firm at \$70. Domestic grades are quiet and unchanged in price.

We quote ferro-manganese at \$46.00, Baltimore, and \$50.00 for prompt delivery. The freight rate from Baltimore to Pittsburgh is \$1.95 per ton.

Fifty per cent ferro-silicon is quoted nominally at \$70, Pittsburgh, for prompt and forward delivery; 12 per cent, \$22; 11 per cent, \$21; 10 per cent, \$20, f. o. b. Globe, Jisco and Ashland furnaces. The freight rate to Pittsburgh is \$1.90. The foreign grades are held at \$1 or more a ton over domestic prices.

Plates.—The market for plates has become very strong, and manufacturers are now operating mills at nearly 100 per cent of capacity, and are slowly increasing their time asked for deliveries from eight to ten weeks. One leading interest is asking 90 days. Reservations on car contracts indicate a

much greater volume of plate tonnage during the last half of the year, and have strengthened the price of 1.25c with some talk of premiums for prompt shipment from the buyers' standpoint. The last big distribution of cars by railroad companies has added some 40,000 to 50,000 tons of plate material to the mills. Ship plates are also in good demand, and inquiries indicate a much more active season from this source of buying. About 2,000 cars were placed with the Standard Steel Car Co. during the past week through the purchases by the Canadian-Pacific railroad and the Harriman Lines. The Pressed Steel Car Co. through its subsidiaries has taken 3,000 to 4,000 cars calling for extensive plate tonnages. We quote the market as follows:

Tank plates, ¼ inch thick, 6¼ to 100 inches, 1.25c. Extras are as follows per 100 pounds: Boiler and flange steel plates, 0.10c; A. B. M. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c Gages under ½ inch to and including ⅝-inch plate on thin edge, 0.10c; under ⅝ and including No. 9, 0.25c. Five cents extra for less than carloads. Terms net cash in 30 days.

Sheets.—New business in sheets is growing larger, and the market has become much firmer in price, while specifications are maintaining their heavy character in volume, forcing the sheet manufacturers to the highest productive capacity to meet requirements. Independent manufacturers who were slow to respond to the advance in prices have now placed their minimum on black sheets No. 28 gage at 1.95c, and galvanized at 3c, so that the market is uniform on quotations. Some of the larger makers are demanding eight weeks for the shortest term of delivery, and this period will likely be increased in the near future. The leading interest during April had the best record in its history for both production and shipments of sheets, surpassing the highest known months easily in this respect. New bus-

ness is very fair, and at the new prices which insures a better position for the sheet trade in the immediate future. We quote the market as follows:

Flat Sheets

Black Sheets.—Nos. 10-12, \$1.60 per 100 pounds; Nos. 13-14, \$1.65; Nos. 15-16, \$1.70; Nos. 17-21, \$1.75; Nos. 22-24, \$1.70 to \$1.80; Nos. 25-26, \$1.75 to \$1.85; No. 27, \$1.90; No. 28, \$1.95; No. 29, \$2.00; No. 30, \$2.10.

Blue Annealed.—Nos. 3-8, \$1.35 per 100 pounds; Nos. 9-10, \$1.40; Nos. 11-12, \$1.45; Nos. 13-14, \$1.50; Nos. 15-16, \$1.60.

Galvanized.—Nos. 10-11, \$2.00 per 100 pounds; Nos. 12-14, \$2.10; Nos. 15-16, \$2.25; Nos. 17-21, \$2.40; Nos. 22-24, \$2.50; Nos. 25-26, \$2.70; No. 27, \$2.85; No. 28, \$3.00; No. 29, \$3.10; No. 30, \$3.30.

Roofing Sheets

Galvanized

Net extras on all gages per 100 Pounds. Corrugated 2-inch, 2½-inch, 3-inch and 5-inch corrugation, 5c; 2 V crimped without sticks, 5c; corrugated 1¼-inch corrugation, 10c, 3 V crimped without sticks, 10c; pressed standing seam with cleats, 15c; plain roll roofing with cleats, 15c.

Painted Roofing

12 to 18 gage, inc., 5c; 19 to 24 gage, inc., 10c; 25 to 28 gage inc., 15c.

Tin Plate.—Specifications continue to increase in volume for tin plate, and shipments are growing larger. Independent capacity is now more nearly satisfied than for many months. While there is some business taken at \$3.35 per base box, Pittsburgh, the bulk of new business is believed to be going at \$3.40, and much buying in the immediate future as in the past will eliminate the lower price. The late season in terne plate buying has held that market on a lower level than any of the others, but during the past two weeks the demand has improved and shipments are more satisfactory. Prices are unchanged. We quote the market as follows:

Coke tin plate, 100-pound basis, 14 x 20, \$3.35 to \$3.40, f. o. b. mill, Pittsburgh district.

Rails and Track Material.—Considerable new tonnage in steel rails has reached the Pittsburgh mills, particularly in standard sections, for eastern delivery, and the open-hearth rail capacity is especially heavily taxed to meet requirements, while inquiries indicate a further buying movement covering the requirements of the eastern railroads. The demand for light rails has continued to grow stronger after a slight pause due to the firmer price being quoted, and the mills are operating now to capacity on both standard and light sections. Track material is in better demand, and specifications are coming out more liberally owing to weather conditions being more favorable for repair and extension work. The market is quoted as follows with the base price 1.34c per pound at the mill:

Fifty-pound and heavier, 1.25c per pound;

carloads and less than 500 tons, 1.34c per pound; light rails on base weight of 40 to 45 pounds, 1.15c, the schedule on the other weights being irregular and subject to negotiations; angle splice bars for standard, sections, 1.50c, Pittsburgh; track bolts, 2.20c to 2.25c, Pittsburgh.

Railroad Spikes

4½, 5 and 5½ and 9-16.....	\$1.40
3, 3½, 4, 4½ and 5 x ½.....	.13
3½ 4 and 4½ x ¾.....	.20
3, 3½, 4 and 4½ x ¾.....	.30
2½ x ¾.....	.40
2½, 3 and 3½ x ¾.....	.60
2 x 5-16.....	.80

Steel.—Scarcity of semi-finished steel in the Pittsburgh market for prompt delivery is becoming acute. The demand has become more active due to the supplemental purchases by consumers to enlarge their contract supplies, and these have been based on the higher prices for both rolling billets and sheet bars. The sale of small billets at \$20.50, Pittsburgh, last week has not been duplicated, and most of the leading makers are out of the market until July 1. The only price quoted on rolling billets is \$22, Pittsburgh, and sales are confined to small lots with a demand of 60 days for delivery. Some of the inquiries appearing in the market are for such tonnages as to indicate that larger buyers are seeking to cover their requirements quietly, and it is likely that this will make a sharp change in the prices, as the available supply becomes exhausted. We quote the market as follows:

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at \$21.00, with the usual extra for size and analysis, and open-hearth rolling billets, \$21.00; Bessemer sheet and tin bars are quoted at \$21.00 to \$22.00, and open-hearth sheet bars are quoted at \$21.00 to \$22.00, f. o. b. Pittsburgh, for second quarter, with full freight to destination added. Forging billets are quoted at \$28, Pittsburgh.

Hoops and Bands.—The demand for steel hoops and bands is normal, and specifications are coming out regularly with shipments very satisfactory. Prices are unchanged, and new business is not particularly important. We quote the market as follows:

Hoops in carload lots, 1.25c to 1.30c, Pittsburgh; in less than carload lots, 1.40c; bands 1.20c, base, with net extras, as per standard steel.

Merchant Bars.—New business in merchant bars is not showing any marked change, the current bookings being relatively small, but taken on at the minimum of 1.20c, Pittsburgh. The bar makers are getting specifications in liberally, and are operating to capacity. Any large buying of bars, it is believed, would soon act as an influence toward a higher price, and raise it to a new level. There is a slightly better demand for iron bars, and prices are a little firmer with sales more nearly 1.35c than for

some time. Steel shafting is much improved. Specifications are better than for a long time, and the mills are running nearly to capacity with prices extremely firm. This is marked improvement over a few weeks ago when shafting was more or less weak and unsatisfactory. We quote the market as follows:

Common iron bars, 1.30c to 1.35c, Pittsburgh; Bessemer and open-hearth steel bars, 1.20c; plow and cultivator, 1.25c; channels, angles, zees, tees, under 3 inch, 1.25c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds of a size, 0.35 advance. Cold rolled and ground shafting, 65 per cent off in carloads and 60 and 10 per cent in less than carloads, delivered in base territory.

Muck Bar.—The market for muck bar is still showing no new life, and prices remain nominally the same, although leading producers claim that a demand for any considerable tonnage would likely show a stronger price owing to the generally higher price of gray forge iron now demanded by furnaces. While the nominal price is \$28 to \$29, it is doubtful whether new tonnage could be placed below the higher figure. We continue to quote, however, \$28 to \$29, Pittsburgh.

Structural.—Inquiries for structural material in the Pittsburgh market have not been as active as in other sections, but mills are well supplied with tonnage and are operating to capacity. The smaller contracts include the 500 tons for the Fort Pitt hotel addition, which was awarded to the Noelke-Richards Co., of Indianapolis, and some light forms of bridge work. There is still pending a fair lot of tonnages for bridges for streets and highways in the immediate vicinity of Pittsburgh, and for one or two large buildings which have not been placed. Railroad bridge building has become of greater volume. Fabricating shops are now operating to capacity, and prices have become much firmer. Plain material is held at a minimum of 1.25c, and new business is being taken subject to considerable delay in delivery. The Riter-Conley Mfg. Co. has taken 1,000 tons of material and the erection of a building for the Olympic-Portland Cement Co., of Bellingham, Wash., 200 tons, and for a power house for the M. H. Kellogg Co., at Chicora, Fla. We quote the market as follows:

Beams and channels, 15 inches and under, zees, 1.25c; tees, 1.25c; angles, from 3 to 6 inches, 1.25c; over 6 inches, 1.35c; universal and sheared, 1.30c; over 15 inches, 1.35c; plates, 6¼ inches wide and wider, 1.35c.

Merchant Pipe.—The market is much stronger for merchant pipe, and prices are extremely firm, while speci-

fications are coming in more liberally and shipments are on a larger basis than for some time past. The demand for steel line pipe, while not large, is showing some weakness, and through severe competition some shading has been done in prices among the competitors for more important contracts. The leading interest is well booked up on steel pipe for some time ahead, and is maintaining a firm attitude on all prices. During the week, a contract for 12 miles of 12-inch line pipe for West Virginia delivery was placed with Ohio mills, and there is considerable inquiry now appearing for small lots, which in the aggregate represent a very attractive tonnage. Better weather conditions are causing a more active inquiry for oil country goods generally. The temporary weakness is expected to disappear with this improved condition. We quote the official discount to jobbers, subject to the usual preferential discount to the larger buyers, as follows:

Iron and Steel Pipe Basing Prices.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
Butt weld.				
3/4, 1/2 inch.....	74	54	68	48
3/4 inch.....	75	65	69	53
1/2 inch.....	78	68	72	59
3/4 to 1 1/2 inch.....	81	73	75	64
2 to 3 inches.....	82	75	76	65
Lap weld.				
2 inches.....	79	72	72	63
2 1/2 to 4 inches.....	81	74	74	66
4 1/2 to 6 inches.....	80	72	73	65
7 to 12 inches.....	77	68	71	61
13 to 15 inches.....	55	..	47	..
Extra Strong, Plain Ends.				
Butt weld.				
3/4, 1/2, 1/4 inch.....	70	60	65	55
1/2 inch.....	75	69	70	63
3/4 to 1 1/2 inch.....	79	73	74	65
2 to 3 inches.....	80	74	75	66
Lap weld.				
2 inches.....	76	70	71	63
2 1/2 to 4 inches.....	81	74	74	66
4 1/2 to 6 inches.....	77	71	72	65
7 to 8 inches.....	70	60	65	55
9 to 12 inches.....	65	55	60	50
Double Extra Strong, Plain Ends.				
Butt weld.				
1/2 inch.....	65	59	60	52
3/4 to 1 1/2 inch.....	68	62	63	55
2 to 3 inches.....	70	64	65	57
Lap weld.				
2 inches.....	66	60	61	52
2 1/2 to 4 inches.....	68	62	63	57
4 1/2 to 6 inches.....	67	61	62	56
7 to 8 inches.....	63	50	55	45

Plugged and reamed pipe is furnished at 2 points higher price, either butt or lap weld.

The above discounts are for full weight pipe, subject to a variation of 5 per cent, merchant pipe, when specified, being furnished up to 6 inches at one point higher discount (lower price).

Boiler Tubes.—A much firmer tone to prices is noted in the market for boiler tubes, and specifications have improved. Shipments have increased, and mills are running to a better advantage than for some time. Locomotive boiler tubing is particularly strong, and leads in demand. Prices

have become firmer throughout the list. The official discount on charcoal iron boiler tubes follows:

Steel

1 3/4 to 2 1/4 inch.....	65
2 1/4 inch.....	67 1/2
2 3/4 to 3 1/4 inch.....	72
3 1/2 to 4 1/2 inch.....	75
5 and 6 inch.....	67 1/2
7 to 13 inch.....	65

Charcoal Iron

1 1/2 inch.....	48
1 3/4 to 2 1/4 inch.....	50
2 1/4 inch.....	55
2 3/4 to 5 inch.....	60

To destination east of Mississippi river will be sold at delivered discount for carloads lowered by 2 points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire Products.—The demand for wire nails has shown some improvement, and while the volume of business is necessarily small because consumers are well covered for some time ahead, such trade as is going is quoted at \$1.60 for wire nails, and \$1.40 for plain wire. Specifications are increasing, enabling the manufacturers to operate practically to capacity. While the bulk of shipments is now being made on contracts taken on the \$1.55 base, there are still a few contracts running on the \$1.50 base, and it is expected that this earlier priced material will not be cleaned off the books until well into June. We quote the market as follows:

Wire nails, jobbers, carload lots, \$1.60; retailers' carload lots, \$1.60 to \$1.65; cut nails (western makers), jobbers' carload lots, \$1.55 to \$1.60, painted barb wire, jobbers' carload lots, \$1.60; retailers' carload lots, \$1.65 with 30c for galvanizing; plain wire to jobbers in carloads, \$1.40; and to dealers, in carloads, \$1.45; polished staples, \$1.60; galvanized staples, \$1.90.

Wire Rods.—The demand for wire rods is unchanged, and inquiries are few, but specifications against contracts are heavy, and such buying as is now being done is mainly of a supplemental nature to earlier contracts. There is a firm tone to the market, with slightly higher level in prices. We quote \$26 to \$26.50 for Bessemer and open-hearth wire rods for second quarter delivery.

Coke.—The market for spot furnace coke has been stronger during the past week, the demand coming in many instances from consumers who were not in the market during the strenuous days of the severe shortage, but have exhausted their reserve supplies of that time. Spot coke sales have declined to as low as \$2.35, ovens, but during the past week an aggregate of from 18,000 to 20,000 tons was closed for the next few weeks' delivery at \$2.45, ovens, and other lots at \$2.50, ovens. There is not much available spot coke now in sight. Within the next 30 days, between eight and ten blast furnaces depending upon the Connellsville region for coke will blow in, and while it is

hoped to have the production of that region improved materially, it is not believed that it will come near meeting the actual requirements of the consumers. The production is still disappointing, largely due to the severe scarcity of labor, it being estimated that at least 3,000 men are needed in the Connellsville region at this time. Contracts for the last half are still being negotiated, and the bulk of the quotations made are at \$2.50, ovens. The larger producers stand "pat" on this price. A sale of 5,000 tons for last half was made at \$2.35, ovens, during the past week, but this is not accepted by the other producers as a basis, and a number of tenders of that price and some at \$2.40, it is known, have been rejected. Some small interests have placed contracts at \$2.45, but the bulk of the business still to come seems to promise \$2.50 as a minimum on six months' contracts, and a still better figure is talked of by the coke operators who realize that they have reached the maximum of their capacity, with 85 per cent of the furnace interests active, and with 15 per cent more yet to come in to eat up what coke can be developed under unusual stress and driving of all plants. A large number of contracts are now pending, and shipments have begun from the Connellsville region for furnaces that will blow in within the next week or ten days. Two lake region furnaces, two in the Pittsburgh district, one in Ohio, one in eastern Pennsylvania, and one in New York state, are to go in within the next few weeks. Another in western Pennsylvania is scheduled to blow in within 30 days. *The Connellsville Courier* for the week ending April 27 shows 32,591 ovens active with a production of 401,494 tons, as compared with a total of 32,345 ovens active and a production of 396,320 tons for the preceding week, the gain being very small in spite of the utmost effort, and with the inducement of higher wages to coke makers. Some of the operators running on low-priced contracts have secured concessions from consumers covering the remainder of their contract period, that will enable them to pay the increased wage rate to hold their men in line without a direct loss. The demand for foundry coke continues unchanged, and prices are firm. We quote standard Connellsville foundry coke for spot shipment \$2.50 to \$2.75, and on contract \$2.50 to \$2.75, ovens. On standard Connellsville furnace coke, we quote, for spot shipment \$2.45 to \$2.50, and on contract \$2.35 to \$2.50, ovens.

Old Material.—There has been a very marked increase in the buying of heavy melting steel during the past few days in the Pittsburgh territory, some of the larger consumers appearing in the market and taking round lots at the

advanced price of \$13.50. Between 8,000 and 10,000 tons have moved under this price, and inquiries are out for fully as much more for prompt shipment. The whole range of old material is very firm, and prices have stiffened in some of the grades, but quotations remain the same, or are changed so slightly as to not warrant altering the present market as a whole. Eastern buyers have been extremely active also, one large consumer having closed for 20,000 tons of

material within the past week, and is inquiring for additional tonnage. The bidding on the Pennsylvania railroad scrap is believed to have been very active, and prices that were secured are estimated to have been much higher than was generally anticipated. There is still a scarcity in borings and turnings, and the demand continues unchanged, and is quickly absorbing all that can be secured. Low phosphorus scrap is still quiet, but firm. We quote

gross tons, delivered in the Pittsburgh district, including Monessen, Steubenville, Brackenridge and Follansbee, as follows:

Heavy melting scrap.....	\$13.25 to 13.57
Rerolling rails	13.50 to 14.00
Malleable	12.00 to 12.55
Bundled, sheet scrap.....	11.00 to 11.50
Iron axles	22.00 to 22.50
Old iron rails.....	15.00 to 15.50
Stove plate	9.00 to 9.50
No. 1 wrought scrap.....	12.50 to 13.00
Old car wheels.....	12.50 to 13.09
Low phosphorus	15.00 to 15.25
Machine shop turnings.....	10.00 to 10.50
Cast borings	10.00 to 10.25
No. 1 cast scrap.....	12.75 to 13.00

CHICAGO

Deliveries from Mills Are Slower

Office of THE IRON TRADE REVIEW,
1328 Monadnock Bldg., May 7.

Deliveries are now the paramount consideration with all mills. On steel bars, about the best that can be obtained is four weeks, while many mills are offering no better than six weeks. The latter period seems to be the minimum on plates and shapes. As a result, the demand for steel out of stock has shown a perceptible increase and warehouse prices in Chicago have been advanced from \$1 to \$2 a ton. Steel bars out of stock are now quoted 1.60c, while structural material and plates are 1.70c. Store prices on sheets have also been advanced. Over 17,000 tons of structural material will be required for fabricating orders placed in the west recently. It is evident from the prices which are being quoted on fabricated material that most of the structural interests are covered for their plain material at much lower quotations than those now prevailing.

Pig Iron.—The market has quieted down considerably and it could hardly be expected that buying would maintain indefinitely the pace set during the latter part of April. For the time being, most of the foundries in the west are well covered, although there is still large tonnage to be placed for consumption during the second half. There is little likelihood of additional furnaces being blown in in this territory, largely on account of the coke situation, and with the foundry melt gradually increasing, prices are expected to be firm during the remainder of the year. A Moline manufacturer is in the market for 1,200 tons of Southern No. 2 or its equivalent. There is an inquiry in the local market for 7,500 tons of malleable, the details of which are

carefully guarded. Malleable sales have been heavy recently, including 1,500 tons placed with a Wisconsin foundry and 3,000 tons sold at East St. Louis; it is understood that Chicago furnaces will furnish this iron. Some of it was placed on a basis of \$14, f. o. b. furnace, but it is doubtful whether these prices could be duplicated. A Milwaukee manufacturer of special material has purchased 800 tons of southern iron and 1,200 tons of northern foundry.

The following prices represent the market for Chicago delivery, except northern foundry and malleable Bessemer, which are quoted f. o. b. local furnace.

	Third quarter.	Last half.
Lake Superior charcoal.....	\$15.50	15.75
Northern foundry No. 2.....	14.50	14.50
Southern foundry No. 2.....	15.35	15.35
Southern silv'ries, 5 per cent sil.	16.10	16.35
Jackson co. silv'ries, 8 per cent	17.40	17.90
Malleable Bessemer	14.50	14.50
Alabama basic	15.35	15.35

Billets.—The demand for forging billets is growing and the supply is gradually becoming limited, due to active mill operations. On re-rolling billets prices are purely nominal. We quote, open-hearth forging billets, \$28, Chicago; re-rolling billets, \$24.

Merchant Bars.—Further improvement is noted in the bar iron market and orders at 1.25c, Chicago, are becoming more common. One of the largest mills in this territory rolling iron is filled up for two months in advance. There is also heavier demand for hard steel and prices are very firm. One of the local mills rolling this material was closed down last week on account of a lack of rails. The steady stream of specifications for soft steel bars does not diminish and four weeks is about the best delivery now obtainable,

while many mills are unable to offer better than six weeks. Prices are firmer on shafting and mill discounts in carloads have been advanced to 62 per cent. There is a much heavier demand for steel out of stock and store prices on soft steel bars are now 1.60 to 1.65c Chicago.

We quote, f. o. b. Chicago, as follows:

Bar iron, 1.20c to 1.25c; hard steel bars, rerolled, 1.18c to 1.22c; soft steel bars, bands and small shapes, 1.38c base; hoops, 1.48c; smooth finished machinery steel, 1 inch and larger, 1.78c; shafting 62 per cent off list for carload lots, 58 per cent off for less than carloads.

On iron and steel from local stock, we quote as follows:

Bar iron, 1.50c to 1.60c per pound base; soft steel bars, 1.60c to 1.65c per pound base; soft steel hoops, 1.80c to 1.90c, full extras.

Structural Material.—Although mills are accepting no current orders for less than 1.43c, Chicago, for plain material, it is evident that a large number of fabricators are well covered at much lower quotations since fabricating prices have by no means increased in proportion to the advance in plain material. There is a growing volume of fabricating orders in the west, including both large and small contracts. A Chicago fabricator recently covered for 1,500 tons of plain material which will be distributed over five or six jobs, at 1.25c, Pittsburgh. Fabricating orders placed in the west last week total 17,386 tons. The Brothers have placed a contract for their new Chicago warehouse, 8,042 tons, with the Noelke-Richards Iron Works; it is understood the specifications call for Bethlehem shapes. The American Bridge Co. has taken 1,500 tons for the Gibbons building, Chicago, and

has also been awarded 142 tons for St. Benedict's Chapel, at St. Joseph, Minn. Contracts have been let to local fabricators for the John R. Thompson building, Chicago, 900 tons, and for the Advertisers' building, 1,135 tons. New buildings for the Kimberly-Clark Co., Kimberly, Wis., will require 138 tons of shapes. There will be 461 tons of structural material in a reinforced concrete building to be erected by Joshua Green, at Seattle, Wash. The Llewellyn Iron Works has taken 2,200 tons for the Hart Brothers building at Los Angeles, and the same interest has taken 122 tons for the Conservatory building at Los Angeles. The McClintic-Marshall Construction Co. has been awarded 600 tons for new shops of the Algoma, Hudson & Central Bay railroad and the Modern Steel Structural Co. has taken 200 tons from the Emerson-Brantingham Co., Rockford, Ill., for a new foundry. Other structural contracts reported in the west recently are as follows: Sandy river bridge, Troutdale, Ore., 119 tons, let to the Northwest Steel Co.; trusses and girder spans for the Crystal City & Uvalde Railroad Co., 329 tons, to the El Paso Bridge & Iron Co.; two 300-foot pin spans for the Kansas City Bridge Co., Kansas City, Mo., 381 tons, to the Missouri Valley Bridge & Iron Co.; rock house for No. 3 and No. 4 shafts of the Akmeek mine, for the Akmeek Mining Co., 509 tons, to Worden-Allen Co., and a rock house for No. 1 Kearsarge shaft of the Osceola Consolidated Mining Co., Osceola, Mich., 309 tons, let to the same concern.

An extensive strike of structural iron workers in Chicago was threatened last week, but failed to materialize. The men were granted an increase of 2 cents per hour.

We quote, mill prices, f. o. b. Chicago, as follows:

Beams and channels, 15 inch and under, 1.43c. For extras, see Pittsburgh report.

Store prices have been revised and are as follows:

All angles, 3 inches and larger, including 6 inches, \$1.70 to \$1.75 per 100 pounds; angles over 6 inches, \$1.75 to \$1.80 per 100 pounds, base; beams, 3 to 15 inches, inclusive, \$1.70 per 100 pounds, base; channels, 3 inches and larger, \$1.70 per 100 pounds, base.

Rails and Track Fastenings.—Chicago mills are now provided with sufficient tonnage to keep them busy for some time to come. The Illinois Steel Co. will roll 40,000 tons of Bessemer rails for the Grand Trunk Pacific at South Chicago and 15,000 tons of open-hearth rails for the Canadian

Pacific at Gary. Specifications for track supplies continue heavy.

We quote, light rails, f. o. b. Chicago, and track fastenings, f. o. b. Joliet, as follows:

Light rails, carloads, 25 to 45-pound, 1.20c to 1.25c; 16 to 20-pound, 1.25c to 1.30c; 12-pound, 1.30c to 1.35c; 8-pound, 1.35c to 1.40c.

Light section relayers, 45 pounds and under, subject to inspection, \$21 to \$23; standard section relaying rails, subject to inspection, \$23.50 to \$24.

Track fastenings, f. o. b. Joliet, angle bars, 1.50c; railroad spikes, 1.55c to 1.60c, smaller size spikes, 1.65c, base; track bolts with square nuts, 1.95c to 2.05c base.

Plates.—The question of deliveries is one of paramount interest in the plate situation at present. On account of the filled-up condition of the mills the warehouses are enjoying a much better demand for plates out of stock than existed a few weeks ago and store prices have been advanced to a minimum of 1.70c, Chicago. Car orders have been heavy recently. The Frisco system has ordered 4,600 coal cars, 400 Hart convertible cars and 1,000 box cars from the American Car & Foundry Co. The New Orleans, Mobile & Chicago railroad has ordered 400 box cars from the American Car & Foundry Co., and the Chicago, Indianapolis & Louisville has purchased 1,000 box cars from the Haskell & Barker Car Co. The Canadian Pacific has bought 4,000 box cars, divided between the Western Steel Car & Foundry Co. and the Standard Steel Car Co., and also it is reported will build 2,000 freight cars in its own shops.

We quote, f. o. b. Chicago, as follows:

Tank plates, ¼ inch thick, 6½ to 10½ inches wide, 1.43c. For extras, see Pittsburgh report.

Store prices are as follows:

Tank steel, ¼ inch and heavier, up to 72 inches wide, \$1.70.

Sheets.—There has been very little change in the sheet situation recently. Prices are still somewhat irregular, although the cutting seems to be growing less. Western mills are running at full capacity.

Store prices have been advanced and we quote as follows:

Blue annealed, No. 13, 2.00c; No. 12, 2.05c. Box annealed, No. 28, 2.35c. Galvanized, No. 28, 3.45c.

For mill prices, see Pittsburgh report. Freight to Chicago, 18 cents.

Wire Products.—Much better weather has improved the demand for wire and the volume of orders is increasing. Prices are correspondingly better, all business now being taken on a basis of 1.60c, Pittsburgh, for wire nails. Western mills are operating

well up to their capacity and shipments are heavy.

We quote, f. o. b. Chicago, as follows:

Wire nails, jobbers' carload lots, \$1.78; retailer's carload lots, \$1.88; retailers' less than carload lots, \$1.98; painted barb wire, jobbers' carload lots, \$1.78; retailers' carload lots, \$1.88; retailers' less than carload lots, \$1.98, with 30c for galvanizing; plain wire, jobbers' carload lots, \$1.58; retailers' carload lots, \$1.63.

Merchant Pipe and Tubes.—There is a large volume of building in Chicago and jobbers report a better demand for merchant pipe. The past week has been more active than any preceding for several months. There is a perceptible improvement in specifications against contracts for boiler tubes and mills are running on better schedules. Prices are also firmer, but have not advanced greatly.

We quote store prices on merchant pipe and tubes, f. o. b. Chicago, as follows:

Iron and Steel Pipe Basing Prices.

	Steel.	Iron.	Black. Galv.	Black. Galv.
Butt.				
¼ inch and ¼ inch	71.2	50.2	63.2	42.2
½ inch	75.2	64.2	68.2	52.2
¾ inch to 1½ inch.	78.2	69.2	71.2	59.2
Lap.				
2 inch	76.2	68.2	68.2	58.2
4½ inch to 6 inch.	77.2	68.2	69.2	63.2
Card Weight.				
7 inch to 12 inch...	74.2	63.2	67.2	56.2
Extra Strong Plain Ends.				
Butt.				
¾, ¾, ¾ inch....	66.2	54.2	60.2	48.2
½ inch	71.2	59.2	65.2	53.2
2 inch to 3 inch....	76.2	64.2	....	....
Lap.				
2 inch	72.2	60.2	66.2	54.2
7 inch to 8 inch....	66.2	54.2	60.2	48.2
Double Extra Strong.				
Butt.				
½ inch	59.2	47.2	....	....
¾ inch to 1½ inch.	62.2	50.2	....	....
Lap.				
2 inch	60.2	48.2	....	....
4½ inch to 6 inch..	61.2	49.2	....	....
7 inch to 8 inch....	54.2	42.2	....	....

Tubes.

Lap weld Charcoal Shelby
Per cent. Per cent. Per cent.
steel. iron. seamless.

1 inch	39	..	57½
1¼ to 2¼ inch....	55	40	35
2¼ to 3¼ inch....	65	50	46
3¼ to 4½ inch....	67½	50	46
5 to 6 inch....	55	..	..

Cast Iron Pipe.—There were several important lettings last week and the bulk of the business was taken by the United States Cast Iron Pipe & Foundry Co. This concern was awarded 1,500 tons at Columbus, O.; 7,800 tons at St. Louis; 600 tons at Horicon Junction, Wis., and is low bidder on 725 tons at Cincinnati.

We quote, f. o. b. Chicago, as follows:

Four-inch water pipe, \$27.00, 6 to 12 inches, \$25.00, larger sizes, \$24.50; gas pipe, \$1 a ton higher.

Old Material.—There has been practically no change in quotations

in the Chicago scrap market during the past ten days, although a considerable volume of business is moving. A large number of railroad lists are out. The Santa Fe is asking for bids on 6,500 tons, the Big Four system on 6,000 tons, the Baltimore & Ohio on 7,000 tons, including 1,200 tons of No. 1 wrought and 1,500 tons of car wheels, and the Michigan Central on 1,000 tons, closing May 10. There are

still large quantities of unconsumed scrap in outlying centers.

We quote, for delivery in consumers' yards, Chicago, as follows:

<i>Gross Tons.</i>	
Old car wheels.....	\$13.25 to 13.75
Old iron rails.....	15.75 to 16.25
Revolving rails (5 ft. and over)	12.50 to 13.00
Old steel rails (3 ft. and under)	11.75 to 12.25
Frogs, switches and guards....	12.00 to 12.50
Heavy melting steel.....	12.00 to 12.50
Shoveling steel.....	11.00 to 11.50
<i>Net Tons.</i>	
No. 1 R. R. wrought.....	\$12.50 to 13.00

No. 2 R. R. wrought.....	11.50 to 12.00
Arch bars and transoms.....	14.50 to 15.00
Knuckles, couplers and springs.	11.50 to 12.00
Shafting.....	14.50 to 15.00
Iron car axles.....	19.00 to 19.50
Steel car axles.....	15.75 to 16.25
Locomotive tires.....	13.50 to 14.00
Dealers forge.....	10.25 to 10.75
Pipe and flues.....	9.00 to 9.50
No. 1 cast.....	12.00 to 12.50
No. 1 busheling.....	10.30 to 10.50
No. 2 busheling.....	7.25 to 7.75
No. 1 boiler cut.....	8.25 to 8.75
Boiler punchings.....	12.50 to 13.00
Cast and mixed borings.....	6.50 to 7.00
Machine shop turnings.....	7.25 to 7.75
Railroad malleable.....	11.50 to 12.00
Agricultural malleable.....	9.75 to 10.25
Angle bars, splices, etc., iron..	13.50 to 14.00
Angle bars, steel.....	11.00 to 11.50
Stove plate and light cast scrap	10.00 to 10.50

CLEVELAND

Finished Material Specifications Heavy

Office of THE IRON TRADE REVIEW, Penton Bldg., May 7.

Iron Ore.—Heavy ice on the lakes seriously interfered with the ore movement during April, when only 204,042 tons were shipped, compared with 331,645 tons on April, 1911, a decrease of 127,603 tons. During April, 1910, the fleet moved 1,520,305 tons. The season opened that year with a great rush, much to the regret of vessel owners later, when they were compelled to withdraw a considerable number of their vessels from the trade. Shipments by ports for April, 1911, and April, 1912, were as follows:

Port	April 1911.	April 1912.
Escanaba	93,532	80,530
Marquette	14,838	.....
Ashland	41,337	8,288
Superior	76,739	64,416
Duluth	51,042	18,237
Two Harbors	54,157	32,571
Total	331,645	204,042
1912 Decrease		127,603

Preliminary estimates of ore on docks May 1, show 5,717,801 tons on hand, compared with 6,687,325 tons on dock May 1, 1911. Weather conditions this week have not been favorable for operation of boats or for the shipment of ore from mines to upper lake docks. The movement of ore from Lake Erie docks during April, was 1,314,627 tons, compared with 989,574 tons in April, 1911.

Ore base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, \$3.75; Mesabi Bessemer, \$3.50; old range non-Bessemer, \$3.05; Mesabi non-Bessemer, \$2.85.

Pig Iron.—That the sales of pig iron last month were heavy is clearly

shown by the fact that one Cleveland firm sold 158,000 tons. This firm reports some decrease in buying at present, but the demand in northern Ohio is very fair, and from 5,000 to 6,000 tons of No. 2 foundry have been sold within a few days, on a basis of \$13.50, Toledo, and \$13.25, Cleveland, for shipment to other points. We quote, delivered in Cleveland, as follows, the higher quotations when given being for the last half, while the lower quotations are for the first half of the year:

No. 1 foundry.....	\$13.50 to 14.00
No. 2 foundry.....	13.00 to 13.50
No. 2 southern.....	15.10 to 15.35
Gray forge.....	12.50 to 12.75
Bessemer.....	15.15
Lake Superior charcoal.....	15.50 to 16.00
Jackson co. 8 per cent silvery..	17.05

Coke.—Furnaces which are anxious to blow in, if they can make satisfactory contracts for coke, are still figuring with coke sellers, but no new contracts are announced. Demand for foundry coke is not active, and prices are somewhat lower. We quote:

Connellsville furnace coke, \$2.40 to \$2.50 for prompt delivery, and \$2.35 on contract; Connellsville foundry coke, \$2.50 to \$2.75 for prompt, and \$2.50 to \$2.75 on contract.

Finished Material.—The Cleveland office of one large independent steel company in the Pittsburgh district reports that last week's specifications against contracts for finished materials were the heaviest for any time this year. Other companies also report heavy specifications, but there are exceptions to the rule. New business with all companies is light. There is a general complaint of shortage of common labor and numerous plants are finding it difficult to get enough men to meet the demand. Bar iron has been sold at very low prices at

distant points, but 1.20c is apparently the minimum for Cleveland mills.

Old Material.—Several railroad lists coming out this week lend the only feature to an otherwise featureless market. The B. & O. list closed today, 12,000 tons, and awards will likely be announced Friday or Saturday; the Michigan Central list, rather larger than usual, will close Friday; the Big Four list closed today and the Lake Shore will also offer a quantity this week. The rolling mills are still aloof from the market and consumers of heavy steel in this locality are also well supplied with material. While prices are unchanged, they are largely nominal. We quote, gross tons, f. o. b. Cleveland, as follows:

<i>Gross Tons.</i>	
Old iron rails.....	\$14.00 to 14.50
Old steel rails (under 6 ft.)...	11.25 to 11.75
Old steel rails (over 6 ft.)....	11.50 to 12.00
Relaying rails.....	19.50 to 20.00
Old car wheels.....	11.50 to 12.00
Old steel boiler plate.....	9.50 to 10.00
Malleable iron (railroad).....	11.00 to 11.50
Steel axles.....	17.00 to 17.50
Axle turnings.....	8.50 to 9.50
Malleable iron (agricultural)...	10.00 to 12.50
Heavy steel.....	11.00 to 11.50
Country mixed steel.....	9.00 to 9.50
Bundled sheet scrap.....	7.50 to 8.00

<i>Net Tons.</i>	
No. 1 R. R. wrought.....	\$11.00 to 11.50
No. 1 busheling.....	9.00 to 9.50
No. 1 machine cast.....	10.75 to 11.25
No. 1 dealers' wrought.....	9.00 to 9.50
Machine shop turnings.....	7.25 to 7.50
Pipes and flues.....	8.00 to 8.50
Wrought drillings.....	7.25 to 7.50
Stove plate.....	9.00 to 9.50
Cast borings.....	7.00 to 7.25
Wrought iron piling plate.....	15.50 to 16.00
Wrought iron arch bars.....	14.50 to 15.00

The time in which the stock and bonds of Allis-Chalmers Co. may be deposited under terms of the reorganization plan was extended to June 1 at a meeting of the reorganization committee of the company in New York.

CINCINNATI

Southern Pig Iron Prices Stronger

Office of THE IRON TRADE REVIEW,
503 Mercantile Library Bldg., May 7.

Pig Iron.—The southern pig iron market is stronger and prices have been generally advanced during the past few days, until \$11, Birmingham, for No. 2 foundry, can be quoted for spot shipment, and \$11.25 to \$11.50 for the last half of the year. There is undoubtedly still some iron left in the market that can be had for \$10.75, but the amount is small and very limited as to grades, and is, therefore, omitted from the general price lists. Those furnaces that advanced their prices a few days ago on southern foundry iron to \$11.25 for spot shipment, and \$11.50 for the last half, are still holding for these figures, but no sales have been reported made on this basis. Sales and inquiries in general are for small tonnages and do not, as a rule, go beyond the third quarter. The southern Ohio furnaces at Ironton seem to be holding fairly firm at \$13.50, furnace, for No. 2 foundry iron, and although there has been some cutting of the market prices lately, it has mostly been done by furnaces farther north. Not many sales, however, are being made on the \$13.50 basis. Malleable iron has been selling in good lots, and the aggregate tonnage for the past two weeks has been larger than for any corresponding length of time for over a year. New inquiries here include 1,000 tons of analysis iron from central Ohio for last half delivery; 2,000 tons of southern foundry for third quarter delivery from a western Pennsylvania company, and 3,000 tons of northern grades for the second and third quarter, from a southern Indiana melter. A local melter, and also one in western Kentucky, both of which have lately bought fair quantities of iron, will probably be in the market again soon for an additional supply. Ferro manganese is still scarce, and will probably remain so until the labor conditions in England are settled. Silvery iron has lately increased in price, and is now quoted at from \$16.70 to \$17.20, Cincinnati. With freight rates from Birmingham, \$3.25, and from Ironton, \$1.20, we quote Cincinnati prices as follows:

Southern foundry No. 2.....	\$14.25 to 14.50
Southern foundry No. 3.....	13.75 to 14.00
Southern foundry No. 4.....	13.25 to 13.50
Southern gray forge.....	12.75 to 13.00
Mottled	12.25 to 12.50
Southern No. 1 soft.....	14.25 to 14.50
Southern No. 2 soft.....	13.75 to 14.25
Standard southern car wheel...	25.25 to 25.50
Northern No. 2 foundry.....	14.70

Northern No. 3 foundry.....	14.20
Northern No. 4 foundry.....	13.95 to 14.20
Jackson co. 8 per cent silicon.	16.70 to 17.20

Coke.—There are some fairly good inquiries in the market here for furnace coke, aggregating about 10,000 tons. On the whole, the market is fairly firm and practically unchanged, although a weakness has been shown on certain brands during the past two or three days. Connellsville foundry coke is holding rather firm around \$2.50 to \$2.75 for the best grades, while for the inferior ones, \$2.40 and \$2.50 is being done, according to the conditions under which they are being sold. Connellsville furnace coke is generally reported at \$2.50, although several fairly large sales have been made at \$2.35 during the past week. Coke makers are finding it a hard proposition to increase their production, due to the shortage of laborers, which is chiefly among the coke makers and not the miners. Demand for foundry coke is not as good proportionately as that for furnace grades, which is due to the fact that many foundries took on large stocks about a month ago, when a shortage of supply was threatened by the then pending strike in the coal fields. We quote below from the leading coke producing districts as follows:

	Prompt shipment.	Contract second half.
Connellsville district:		
Foundry coke.....	\$2.75 to 3.00	\$2.50 to 3.00
Furnace coke.....	2.40 to 2.50	2.40 to 2.50
Wise county district:		
Foundry coke.....	\$2.75 to 3.00	\$2.75 to 3.00
Furnace coke.....	2.15 to 2.25	*Sliding [scale basis]
Pocahontas district:		
Foundry coke.....	\$2.75 to 3.00	\$2.75 to 3.00
Furnace coke.....	2.50	2.50
New river:		
Foundry coke.....	\$2.75 to 3.00	\$2.50 to 3.00
Furnace coke.....	2.40 to 2.50	2.25 to 2.50

*Sliding scale basis means \$1.60 for coke based on \$9, Birmingham, for pig iron, with an advance of 16 2-3 per cent of the amount over \$9 which pig iron is quoted. This is the usual basis. Other forms of sliding contracts are also made.

Finished Material.—Prices on steel bars and structurals are 1.20c and 1.25c, Pittsburgh, respectively, although some cutting of these quotations is reported being done in certain instances, but hardly enough to have a general effect. Bar iron is weak and has been sold at 1.25c, delivered, Cincinnati, to an important buyer. Business, as a whole, is better, and sales during the past few days, have aggregated fair tonnages. The local sheet situation is firm, and the local mill is doing a fair volume

of business at the following prices, f. o. b. Pittsburgh: Black sheets, No. 28, 1.95c, and galvanized, No. 28, 3c. The contract for the new Gibson House, this city, will be let May 20. It is also stated that at least a portion of the steel for the new Union station here will be let soon, but those in authority have not set a definite date. For other prices see Pittsburgh report.

Warehouse business has been improved during the past week, and prices have been advanced generally. Improvement seems to be all along the line and not centered on any particular item. We quote warehouse prices, f. o. b. Cincinnati, as follows:

Steel bars, 1.65c base; iron bars, 1.60c base; structurals, 1.75c base; plates, ¼ inch and over, 1.75c base; sheets, blue annealed No. 10, 1.95c base; rivets, cone head, 2.30c base; cold rolled shafting, 60 per cent discount; boiler tubes as follows: 1¾ to 2¼ inch, 60 per cent discount; 2½ inch, 62 per cent discount; 2¾ to 3¾ inch, 65 per cent discount; 3½ to 4½ inch, 67 per cent discount; and 5 to 6 inch, 60 per cent discount; soft steel cold twisted concrete bars, 60 per cent discount; soft steel cold twisted concrete bars, cut to length as follows: ¾ inch square and larger, 1.75c; ½ inch square and larger, 1.85c; ¼ inch square and larger, 1.95c; 5-16 to ¾ inch square and larger, 2.15c; ¼ inch square and larger, 2.25c.

Old Material.—The local scrap iron market is a little weaker, and prices have declined about 25 cents a ton during the past week on most grades. Buying has not been heavy, and local foundries, in some instances, have refused to pay the prices asked by the dealers. One local firm recently sold a small tonnage of mixed cast scrap on a basis of \$9.00 a ton, but this price could be bettered at the present time. Demand does not seem to center on any special grades, but is rather evenly distributed. We quote below prices dealers will pay for gross and net tons as follows:

Gross Tons.

Old iron rails.....	\$12.75 to 13.75
Old steel rerolling.....	11.00 to 11.50
Old iron axles.....	19.00 to 19.50
Steel melting scrap.....	9.75 to 10.25
Car wheels	10.50 to 11.00
Bundled sheet scrap.....	8.25 to 8.75

Net Tons.

Old No. 1 R. R. wrought.....	\$10.25 to 11.25
No. 1 machinery cast.....	9.75 to 10.75
No. 1 busheling.....	8.25 to 8.75
Stove plate	7.00 to 8.00
Machine shop turnings.....	6.00 to 7.00
Cast borings	5.75 to 6.75
Heavy turnings	6.25 to 7.25
Mixed cast	8.00 to 8.75

Directors of the International Harvester Co. were re-elected at the annual meeting.

PHILADELPHIA

Heavy April Output from Eastern Mills

Office of THE IRON TRADE REVIEW,
Philadelphia, May 7.

The eastern market shows a good movement in iron and steel products. Mill operations are heavy and the volume of new business is liberal. The April production of the mills was the best of the year. Scarcity of common labor is proving a factor of some disturbance. Prices in some finished lines are being shaded about \$1 a ton. Pig iron shows less buying vigor. The forward basic market has been well defined by the purchase of a round tonnage by an eastern Pennsylvania buyer at \$15, delivered. Scrap is advancing irregularly. An important ship building contract closed provides for the construction of three additional ocean freighters for the American-Hawaiian Steamship Co.

Pig Iron.—Less activity in fresh inquiry and in selling prevails, but with substantial bookings on hand and faced by the prospect of advanced coke costs the furnaces are more content to have developments come more slowly. Fundamental conditions in this district, to all appearances, are favorable. Consumption among steel makers continues on a much higher plane and some reports of improvement are coming from miscellaneous foundries. Stocks on the banks of both merchant and steel works furnaces are being cut down in an encouraging fashion. The monthly reports of both the Eastern Pig Iron Association and the Virginia Pig Iron Association, which will be made public this week, will show substantial reductions in stocks and equally favorable increases in orders taken. Forward values of basic iron in the eastern market, which have been indefinite because of buyers and sellers being apart in their views of prices, have been more clearly indicated by the week's developments. A leading eastern steel maker has closed with a Schuylkill valley interest for a round block of this grade estimated at 10,000 tons or more, for delivery in the second and third quarters, at \$15, delivered, or \$14.40, furnace. As far as known, this has been the first sale made beyond July 1. Eastern makers generally have been asking \$15.50, delivered, for this period. A central Pennsylvania con-

sumer which recently inquired for 6,000 tons for second quarter has taken 4,000 tons for such shipment from the valleys at slightly over \$15, delivered, equivalent to below \$13, furnace. Another central Pennsylvania basic buyer is out for 2,000 tons. Foundry iron prices still manifest considerable range, delivered in the immediate Philadelphia district. For third quarter, sales of eastern No. 2X have been made at \$15.35, delivered, while a stove manufacturer reports having taken 1,500 tons of eastern No. 2X for last half at about \$14.80, delivered. Generally prices do not fall below \$15, or slightly higher. The \$15, delivered, price for eastern No. 2X has become quite rare. Lehigh and Schuylkill valley No. 2X usually is held at a minimum of \$14.75, furnace. Pipe iron continues scarce and the poorer grades usually command \$14.50, delivered, along the Delaware river. Standard mill forge is firm at \$14.50 to \$14.75, delivered. The Virginia foundry grades show considerable strength. Additional sales of 4,000 to 5,000 tons of standard low phosphorus for third quarter on the basis of \$19.50, Philadelphia, were made in the week and prices for last quarter have been advanced 25 cents to \$19.75 to \$20, Philadelphia. Offers of 2,000 tons at \$19.50, delivered, have been declined. The No. 1 Warwick furnace has gone out, but the new alternate stack A, of 350 tons capacity, will shortly go in, and the two largest furnaces of this plant will then be blowing.

We quote for prompt and third quarter shipment, delivered to buyers in Philadelphia and vicinity, as follows:

Eastern No. 1X foundry.....	\$15.25 to 15.50
Eastern No. 2X foundry.....	15.10 to 15.25
Eastern No. 2 plain.....	14.50 to 15.00
Standard gray forge.....	14.50 to 14.75
Basic	15.00
Virginia No. 2X.....	15.80
Southern No. 2.....	15.00 to 15.25
Standard low phosphorus.....	19.75 to 20.00

Coke.—Last half Connellsville furnace coke offered to eastern buyers at \$2.25, ovens, as recently noted, is understood to have been absorbed by middle western consumers. Eastern furnaces hesitate to pay such levels and are hoping for a \$2 or lower price for last half. The coke market as a whole is easier in tone and

some odd spot lots have been offered at lower prices.

Finished Material.—Eastern mills generally turned out the heaviest tonnage of the year in finished products in April, which amounted to 75 to 80 per cent of full output. One mill ran at practically a 100 per cent gait. This general scale of operations continues, but the putting into service of additional capacity is now being restrained in several instances by shortages of common labor. The factor of an adequate supply of day labor is becoming an increasingly important one for the eastern industry.

New business is coming to eastern makers in a liberal volume. With some mills, it still maintains a week to week increase. A comparison made by one large eastern maker shows practically 50 per cent more unfilled tonnage now on the books than on the corresponding date a year ago. Pig iron stocks in eastern steel makers' hands are being cut down sharply. One plant reduced its stocks 10,000 tons in April and another about 15,000 tons in the past two months. Delivery conditions have become less easy and salesmen are being instructed to be cautious in making early promises.

Scarcity of open-hearth semi-finished steel in the Pittsburgh district has caused buyers in that territory to inquire of eastern makers for early delivery. Billet prices have been advanced \$1 by eastern makers to \$21, Pittsburgh, or \$23.40, Philadelphia, on rolling, and to \$28.40, Philadelphia, on forging billets. Plate and shape prices are still being shaded in some cases in the eastern market by about \$1 a ton to 1.35c, Philadelphia, or 1.20c, Pittsburgh. A considerable tonnage is also going at full prices. Steel bars are firm at 1.20c, Pittsburgh, or 1.35c, Philadelphia. Bar iron continues to advance and some makers are asking 1.35c, Philadelphia. A sale of a carload at 1.32c is noted.

Structural offerings are quite numerous. The Fairmount hotel project for this city has been revised. Bids will be taken May 10 on a 22-story building to require 3,000 to

4,000 tons. The Childs restaurant interests have acquired a site on South Penn Square and are planning the erection of a large building.

Bids have been asked for 700 tons for column cores for the Lasher building, this city, and have gone in for 900 tons for a garage for the Bellevue-Stratford hotel, this city. James G. Doak has the general contract for the Vendig hotel, this city, 1,600 tons. Revised bids will be asked for the steel work. W. A. Chesterman has the general contract for the Wallerstein hotel, Richmond, 800 tons. Plans are being drawn for the Murphy hotel, Richmond, to require about 1,500 tons. Steele & Wike have 500 tons for the Burg Bros. store, this city. The Corrugated Bar Co. has taken 500 to 600 tons of twisted steel bars for Panama at 1.14½c, Pittsburgh base. The Southern railroad has distributed 1,500 tons of car material among Pittsburgh mills.

We quote, delivered in Philadelphia and vicinity, as follows:

Plain structural shapes, 1.35c to 1.40c; tank plates, 1.35c to 1.40c; steel bars, 1.25c; common bar iron, 1.30c to 1.35c; cut nails, 1.65c to 1.70c; blue annealed sheets, No. 10 gage 1.55c to 1.60c; 4 x 4-inch open-hearth rolling billets, \$22.40 to \$23.40; forging billets, \$26.40 to \$27.40. Extras shown under Pittsburgh report.

Ship Building Work.—The American-Hawaiian Steamship Co. has closed with the Maryland Steel Co. for three additional ocean freight vessels, to be operated through the Panama canal. This makes a total of eight boats of the type under contract for this steamship company with the Sparrows Point yard. The boats will each be of about 10,000 tons displacement and together will require about 18,000 tons of shapes and plates for delivery in 1913. The additional contract fills the ways of the Maryland Steel Co. on large work for more than two years ahead. Another eastern yard is reported to have taken a large boat for a Pacific coast steamship interest. The volume of ship building work on the books of eastern yards now runs into many millions.

Old Material.—Higher prices continue to be paid for some grades of old material. The Pennsylvania and other railroad lists closed in the past week, brought close to \$14, delivered, on the strictly first class steel, and about \$11, delivered, for the turnings. About 5,000 to 7,000 tons of the re-rolling rails are reported to have brought the railroad asking price of

\$15, delivered. It is indicated that most of the railroad lettings went to the mills direct. The market shows good buying volume. There has been considerable buying of steel scrap between dealers. One dealer took 5,000 to 10,000 tons of heavy melting material at \$13.50, delivered. There has been considerable quiet interest in wrought. A sale of 500 tons of No. 1 railroad wrought at \$16.25, delivered, is noted. Pipe makers and other consumers have been buying car wheels. Borings are weaker. We quote gross tons, delivered in consumers' yards in eastern Pennsyl-

vania and western New Jersey, as follows:

Old iron rails.....	\$16.50 to 17.00
Old steel rails (rerolling).....	14.50 to 15.00
No. 1 heavy melting steel.....	13.50 to 14.00
Old car wheels.....	13.50 to 14.00
Old iron axles.....	23.00 to 24.00
Old steel axles.....	17.50 to 18.00
No. 1 railroad wrought.....	16.00 to 16.50
Wrought pipe.....	12.75 to 13.25
Cast borings.....	9.25 to 9.75
Machine shop turnings.....	10.75 to 11.00
Heavy cast.....	13.50 to 14.00
Malleable.....	11.75 to 12.25
Stove plate.....	10.50 to 11.00
No. 1 forge.....	11.75 to 2.25

Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: \$0.60 to Ivy Rock, Pa.; \$0.65 to Phoenixville, Pa.; \$0.80 to Coatesville, Pa.; \$0.85 to Bethlehem, Pa., Reading, Pa., and Roehling, N. J.; \$1.10 to Pottsville, Pa., Lebanon, Pa., and Columbia, Pa.; \$1.20 to Harrisburg and Steelton, Pa.; \$1.40 to Milton, Pa.

ST. LOUIS

Orders for Steel Rails Placed

Office of THE IRON TRADE REVIEW,
St. Louis, May 7.

Pig Iron.—Inquiries for pig iron in the St. Louis territory probably do not total more than 1,500 tons, in lots of from 200 to 800 tons, but prices are stiff at \$11 for Southern No. 2 for third quarter shipment, and at \$11.50 for fourth quarter. Local sales agents are firm in the belief that some good business is about to break in this territory. Our tabulated prices for Southern iron, delivered, to which the Birmingham freight of \$3.75 has been added, follow:

Southern No. 1.....	\$15.25
Southern No. 2.....	14.75
Southern No. 3.....	14.25
Southern No. 4.....	13.75

Coke.—Very little new business is being placed in coke, but shipments on contracts have been good. By-product coke has gone up to \$5.55, delivered. Our prices on foundry and furnace grades remain as follows:

We quote 72-hour Connellsville foundry grades, \$2.50 to \$2.65 for second quarter of 1912; 72-hour foundry, \$2.25 to \$2.50 on tracks and \$2.75 to \$2.85 for immediate delivery; 48-hour Connellsville furnace, \$2 to \$2.25; best 72-hour Virginia foundry, \$2.50 to \$2.75; 48-hour Virginia furnace, \$2 to \$2.25. The freight to East St. Louis and St. Louis is \$2.80, and \$2.70 from the Virginia fields when shipment is destined beyond St. Louis.

Finished Material.—Orders were placed Friday by the Frisco railroad company for 10,000 tons of steel rails, by the Missouri Pacific for 6,500 tons of steel rails, and inquiries are pending on 500 to 1,000 tons. The market for steel rails is quite active. Track fastenings are in exceptional demand, and specifications up to date are nearly equal to the contracts for the year.

Structural material is in fair demand, with prices unchanged from last week. Contracts were let Friday for 300 tons of structural steel to be used in the Wall building at Vandeventer avenue

and Olive street, and 500 tons for the new Mutual Brewery Co.'s buildings. Contracts probably will be let in a few days for the steel to be used in erecting the Monward building at Broadway and Olive street. The structure will be 25 stories, if it is found that that height is permissible under the city ordinances. In all likelihood, the work will go to the James Stewart Construction Co. The building has been in prospect for nearly a year. Its erection is now assured.

Steel bars are quoted at 1.20c to 1.25c Pittsburgh, and plates and structural material at 1.25c, Pittsburgh. Specifications are heavy. Bar iron is in good demand at 1.25c, Pittsburgh.

Old Material.—Dealers seem quite anxious to sell scrap to the rolling mills, and prices show a slight tendency to decline. One sale of 2,500 tons, half of which was car wheels, was made by the Missouri Pacific Railroad, Friday. Our quotations remain nominally as follows:

Gross Tons.

Old car wheels.....	\$13.50 to 14.25
Old iron rails.....	15.25 to 15.50
Re-rolling rails (5 ft. and over).....	13.25 to 13.75
Old steel rails (3 ft. and under).....	12.25 to 13.25
Light section relayers (45 lb. and under) subject to inspec.	21.50 to 22.50
Re-laying rails, subject to inspec.	22.50 to 23.25
Frogs, switches and guards.....	10.50 to 11.25
Heavy melting steel.....	11.50 to 12.25
Shoveling steel.....	10.75 to 11.25

Net Tons.

No. 1 railroad wrought.....	\$11.50 to 12.00
No. 2 railroad wrought.....	13.50 to 11.00
Arch bars and transoms.....	14.25 to 14.50
Knuckles, couplers and springs.....	10.50 to 11.00
Shafting.....	14.00 to 14.50
Iron car axles.....	18.50 to 19.00
Steel car axles.....	16.00 to 16.50
Locomotive tires.....	11.50 to 12.00
No. 1 country wrought.....	9.25 to 9.75
Pipe and flues.....	8.50 to 9.00
Tank iron and cut boilers.....	7.50 to 8.00
No. 1 cut busheling.....	9.25 to 9.75
No. 2 cut busheling.....	6.35 to 7.55
Cast and mixed borings.....	6.25 to 6.50
Machine shop turnings.....	7.00 to 7.25
Railroad malleable.....	10.50 to 11.00
Agricultural, malleable.....	9.50 to 10.00
Stove plates.....	9.50 to 10.00
Angle splice bars (iron).....	11.25 to 12.00
Angle splice bars (steel).....	9.50 to 10.00

NEW YORK

Pig Iron Less Active, But Prices Firm

Office of THE IRON TRADE REVIEW,
1115 West Street Bldg., May 7.

Iron Ore.—The steamship *Tellus*, bearing the first cargo of Wabana, Newfoundland, ore of the season arrived at Philadelphia this week. The shipment amounted to about 12,000 tons. Several additional sales of lake ores have been made to eastern furnaces during the past several weeks, but these have usually been of special grade and the purchasers have been regular consumers. Eastern domestic interests booked considerable tonnage in April in scattered sales.

Pig Iron.—Many consumers in the metropolitan and surrounding territory apparently find themselves well covered on their forward requirements, after the recent active market and new business has dropped down to more ordinary proportions. Prices reflect no weakening tendency, however, and are generally supported by well filled order books and a continued prospect of higher coke prices for last half. The minimum price of \$15.00, tidewater, has become rare and makers usually are asking from 25 to 50 cents above this level. Lehigh and Schuylkill valley grades of No. 2 X are held at about \$14.75, furnace, Virginia No. 2X at \$13, furnace, and Buffalo No. 2X at \$13.50, furnace. In Central Pennsylvania, \$13.50 to \$13.75, furnace for No. 2X is quoted. A Connecticut consumer which inquired for 3,500 tons of No. 2 plain and 1,500 tons of No. 1X for last half, distributed this business in the week, the No. 2 plain iron going to a Central Pennsylvania furnace at \$13.30, furnace, or \$15.65, delivered, and the No. 1 iron to Buffalo makers. A New Jersey stove maker inquired this week for 1,000 tons of high silicon and No. 2X for last quarter. Another Jersey buyer asked for 500 tons of foundry grades for last half. Some inquiry for high phosphorus iron for New England shipment is pending. Several eastern malleable buyers are in the market for small lots, a Rhode Island plant for several hundred tons and a Philadelphia consumer for 500 tons, for early shipment. Considerable contracting for charcoal iron has continued in this district. One consumer recently took 2,500 tons for last half on a basis of \$15.75, Buffalo. The Adrian furnace at Dubois, Pa., was lighted the latter part of last week. One

round block of basic iron for eastern shipment is pending. We quote, at tide-water, for prompt and second quarter shipment as follows, southern and Virginia iron being given at New York docks:

Northern foundry No. 1.....	\$15.25 to 15.50
No. 2X foundry.....	15.00 to 15.25
No. 2 plain.....	14.50 to 15.00
No. 2 Virginia.....	15.80 to 16.05
No. 2 southern foundry.....	15.00 to 15.25
Malleable	15.25 to 15.50
Gray forge	14.50 to 14.75

Ferro-Alloys.—Shortages of ferro-manganese among a number of consumers have become more acute and there is a considerable demand for early shipment material, upon which varying prices are asked. The supply of prompt material seems to be quite limited. A sale of 500 tons for shipment over the next month or so at \$46.00, seaboard, is noted. English makers are not disposed to accept freely the \$46.00 price recently announced for forward shipment and some steel companies which have been in the market are still negotiating. A new inquiry for 600 tons for last half or 1,000 tons for the year ahead has appeared. There has been considerable buying of 50 per cent ferro-silicon in Pittsburgh territory during the past week. In the east, three or four consumers are out with carload inquiries. We quote standard English ferro-manganese for forward shipment at \$46.00, seaboard, with premium prices ruling on prompt material and 50 per cent ferro-silicon at from \$68.00 to \$70.00, Pittsburgh.

Cast Iron Pipe.—Reports of very active conditions in cast iron pipe in the west and south are to be heard. The leading pipe maker is now operating at full capacity in the south. In the eastern district, there is little public work under negotiation, but private contracts are heavy. Cambridge, Mass., will close May 15 on 400 tons. Some makers report more satisfactory prices, but some low quotations are still being made. We quote 6-inch pipe at from \$21.00 to \$22.00, f. o. b. New York, in carload lots, some makers asking up to \$23.00.

Finished Material.—New business in this district in finished lines is not holding even in some cases with the level of April, but this is not out of line with the expectations of steel makers after the heavy movement of last month

when many options at more attractive prices were exercised. With several mills, however, continued increases in bookings are reported. Manufacturers without exception are being favored with heavy specifications. Prices show substantial firmness in most lines. In plates and shapes, the range continues from 1.20c to 1.25c, Pittsburgh, or 1.36c to 1.41c, New York, but the former level does not seem so easily obtainable. Steel bars are strong and bar iron is keeping pace. Billets, particularly open-hearth, are in demand and are advancing.

Structural awards and inquiry in the metropolitan market are not so numerous and prospects indicate less work now in the preparatory stage. The lower prices which were outstanding for acceptance up to May 1 apparently hurried the placing of much work last month and since then new tonnage has not been offered as freely.

In railroad lettings, several good sized contracts are coming out. The Virginia Bridge & Iron Works has taken 7,000 tons, of which 4,000 tons are plates and 3,000 tons shapes, for coal piers for the Norfolk & Western railroad, at Norfolk, Va. The Boston & Maine railroad took bids this week on its bridge requirements extending over a number of months ahead, which will ultimately amount to 4,000 to 5,000 tons. General contractors' bids went in today on section 14 of the Lexington avenue subway, this city, to require 8,000 tons and also on some replacement bridge work for the Western Maryland railroad, 1,500 tons. The Phoenix Bridge Works has taken 300 tons for a bridge for the Philadelphia & Reading railroad, at Yardley, Pa., and the New England Structural Co. 200 tons for a tunnel section for the Boston Transit Commission. The 275 tons for a Lehigh Valley railroad pier, this city, originally reported as having gone to another shop, went to Levering & Gerrigues on final action.

Final plans issued for the Widener hotel, Atlantic City, for which the American Bridge Co. has the fabrication contract, show that the requirements will be considerably heavier than originally estimated and will run about 10,000 tons. Levering & Ger-

PRICE CHART

	PRICES	PRICES			
		May 10 '11	Apr. 10 '12	May 1 '12	May 8 '12
BESSEMER PITTSBURG SPOT	18.00				
	17.00				
	16.00				
	15.00				
	14.00				
	13.00				
FOUNDRY NO. 2 NORTHERN PITTSBURG SPOT	18.00				
	17.00				
	16.00				
	15.00				
	14.00				
	13.00				
FOUNDRY NO. 2 X NEW YORK SPOT	18.00				
	17.00				
	16.00				
	15.00				
	14.00				
	13.00				
FOUNDRY NO. 2 SOUTHERN BIRMINGHAM SPOT	14.00				
	13.00				
	12.00				
	11.00				
	10.00				
	9.00				
LAKE SUPERIOR CHARCOAL CHICAGO	18.00				
	17.00				
	16.00				
	15.00				
	14.00				
	13.00				
BESSEMER BILLETS PITTSBURG	25.00				
	24.00				
	23.00				
	22.00				
	21.00				
	20.00				
STEEL BARS PITTSBURG	28.00				
	27.00				
	26.00				
	25.00				
	24.00				
	23.00				
TANK PLATES PITTSBURG	29.00				
	28.00				
	27.00				
	26.00				
	25.00				
	24.00				
COMMON IRON BARS CLEVELAND	28.00				
	27.00				
	26.00				
	25.00				
	24.00				
	23.00				
OLD STEEL RAILS (Short) CHICAGO	16.00				
	15.00				
	14.00				
	13.00				
	12.00				
	11.00				
HEAVY STEEL CLEVELAND	16.00				
	15.00				
	14.00				
	13.00				
	12.00				
	11.00				

rigues have 1,200 tons for the addition to the Hotel Bossert, Brooklyn, and 400 tons for the Farragut building, Madison avenue, this city; the Phoenix Iron Works 700 tons for the Akron apartment, Seventy-ninth and Park avenue; and Geo. A. Just Co. 600 tons for the Scribner building, Fifth avenue. The Plimpton building, Fifty-ninth street and Thirteenth avenue, reported last week as having gone to an independent fabricator, has been taken by Milliken Bros., Inc. Contracts have been finally signed whereby the American Bridge Co. receives the 2,500 tons for the Manufacturers' Club at Philadelphia, as expected. The Riter-Conley Mfg. Co. has 800 tons for buildings for the Olympic Portland Cement Co., Bellingham, Wash. Post & McCord Co. have the steel contract and the American Bridge Co. will fabricate 600 tons for additions to the A. I. Namm store, Brooklyn. A considerable quantity of cast iron columns will also be required.

Bids will be taken May 9 by the armory board, this city, for the construction of a large armory in the Bronx for the Eighth Artillery district, which will require 7,000 to 8,000 tons. Alterations will also be made to the armories of the Seventh, Twenty-ninth and Twenty-third regiments, and of Squadron C, requiring 1,000 tons or more additional. Bids have gone in on the Turks Head building, Providence, R. I., 2,500 tons, and on an office building at Jacksonville, Fla., 1,500 tons to 2,000 tons. We quote,

delivered at New York tidewater, as follows:

Plain structural shapes 1.36c to 1.41c; tank plates, 1.36c to 1.41c; steel bars, 1.36c; common iron bars, 1.30c to 1.35c; plates and shapes from store, 1.70c to 1.80c; extras as shown under Pittsburgh report.

Old Material.—Old material stocks in the metropolitan district have been reduced considerably in recent months and are now at a low stage. New scrap is coming on the market largely in small lots which are being readily absorbed, and in many cases are going direct to consumers. There continues a fair demand in the market and prices are firm. One inquiry for 500 tons of car wheels for Connecticut has been satisfied. A New York dealer has taken the three months' output of the Third Avenue and Union railroads, this city, about 600 tons monthly, for shipment to eastern Pennsylvania. Jersey City and Newark foundries are paying from \$12.50 to \$13, delivered, for heavy cast. We quote gross tons, prices New York dealers will pay at tidewater, as follows:

Old car wheels.....	\$11.25 to 11.75
Old iron axles.....	16.50 to 17.00
Old steel shafting.....	14.25 to 14.75
No. 1 heavy melting steel.....	11.00 to 11.50
No. 1 R. R. wrought.....	13.00 to 13.50
Wrought pipe.....	9.75 to 10.00
Cast borings.....	6.50 to 7.00
Machine shop turnings.....	8.00 to 8.50
Heavy cast.....	11.00 to 11.50
R. R. malleable.....	9.50 to 10.00
Stove plate.....	8.25 to 8.75
Grate bars.....	7.25 to 7.75

Freight rates on scrap per ton to Steelton, Pa., Columbia, Pa., Pottsville, Pa., and Harrisburg, Pa., are \$1.50 from Jersey City and \$2.00 from New York; to Coatesville, Pa., Ivy Rock, Pa., Phoenixville, Pa., and Reading, Pa., \$1.50 from Jersey City and \$1.80 from New York; to Bethlehem, Pa., \$1.10 from Jersey City and \$1.60 from New York; to Roebing, N. J., \$1.00 from Jersey City and \$1.50 from New York; to Milton, Pa., \$1.60 from Jersey City, and \$2.00 from New York.

BIRMINGHAM

Inquiries Show Improvement in Foundry Conditions

Office of THE IRON TRADE REVIEW,
Birmingham, Ala., May 7.

Pig Iron.—A leading producing interest has practically withdrawn from the market for any delivery, and by reason of conditions existing, other producers are disposed to adhere strictly to a basis of \$11.50 per ton at Birmingham for deliveries in the last quarter. With the exception of the round tonnage sale, of which mention was made in the last report as having been made to a leading pipe interest, the most recent transactions involved comparatively small lots. Prompt deliveries were principally involved in late sales, but in no case is it believed that a basis of \$11 per ton at Birmingham was shaded. The

tonnage recently submitted, and which is now pending, is very attractive, and indicates a material improvement in foundry trade conditions. Producers' records, in practically all cases, show but a small tonnage to have been engaged comparatively, for the last quarter requirement, while in at least two cases, the present rate of production will hardly take care of the tonnage that has been sold for shipment in the third quarter. In this connection, it is interesting to note that the sales made by one producer, so far in this year, are larger in the aggregate than for the same period at any time in its history. As to an increase in the rate of production, much depends on the show-

ing made when stock returns have been received. In all cases, a very heavy movement is reported for the month of April, and except in the territory affected by the high water along the Mississippi river, specifications for the month of May are quite equal to contract requirements. Repairs are being made to two furnaces now idle, one of which will be blown in immediately. The demand for low grades is still very strong, with an insufficient available tonnage to meet the requirement. There is also a good demand for high silicon, and for especial analysis iron for car wheel manufacturers. This last mentioned is quotable at \$12 to \$12.50 per ton at Birmingham, depending on the silicon content, and the delivery required. So far as is known, the recent heavy sale of southern basic iron will not affect local furnace operations, although, with the continued heavy demand for steel products, it is quite likely that some changes will necessarily be made at the Ensley plant. The output of charcoal iron is still represented by two active furnaces, and prices are being held very firm. We quote all grades represented locally, as follows, per gross

ton, f. o. b. cars Birmingham district furnaces:

For delivery prior to last quarter:

No. 1 foundry.....	\$11.25 to 11.75
No. 2 foundry.....	10.75 to 11.25
No. 3 foundry.....	10.25 to 10.75
No. 4 foundry.....	10.00 to 10.50
Gray forge.....	9.75 to 10.25
Mottled.....	9.50 to 10.00
Standard basic.....	10.75 to 11.25
Off basic.....	10.25 to 10.75
Standard charcoal.....	22.50 to 23.00

With the exception of charcoal iron, an advance of 25c to 50c per ton would be asked over the above figures for deliveries in the last quarter.

Old Material. — Dealers report a much stronger market, with the actual forwardings in the past week considerably larger than for some weeks past. A very heavy movement for export is under way from southern points, and northern mills, as well as local mills, are taking a larger quantity of wrought and steel grades. The foundry trade has taken practically all light cast and machinery grades offered locally, which is to take the place of low grade pig iron. Nominal asking prices at Birmingham, are revised as below, per gross ton, f. o. b. car:

Old iron axles (light).....	\$12.50 to 13.00
Old steel axles (light).....	11.00 to 11.50
Old iron rails (scrap).....	11.00 to 11.50
No. 1 R. R. wrought.....	11.00 to 11.50
No. 2 R. R. wrought.....	13.00 to 11.70
No. 1 country.....	6.50 to 7.00
No. 2 country.....	6.00 to 6.50
No. 1 machinery.....	9.50 to 10.00
No. 1 steel.....	8.50 to 9.00
Tram car wheels.....	8.50 to 9.00
Standard car wheels.....	10.00 to 10.50
Light cast and stove plate.....	6.50 to 7.00

demand continues good on account of extensive sheet mill operations.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

Lake copper, carload lots, 16½c; casting, 15½c; smaller lots, ¼c to ¾c higher. Spelter, car lots, 6.75c; lead, desilverized, 4.20c in 50-ton lots; cor-rod- ing, 25c per 100 pounds higher; sheet zinc, 8.65c, f. o. b. La Salle, in car lots of 600-pound casks; pig tin, 45c; Cookson's antimony, 8½c; other grades, 7½c to 8c.

PLAN FOR DEFENSE

Outlined in Annual Report of Harvester Co.

The annual report of the International Harvester Co., just issued, shows total sales in 1911 amounted to \$108,033,596, compared with \$101,166,359 the previous year, and \$86,614,549 in 1909. Net profits were \$15,521,398, a decrease of \$563,422, compared with 1910. After the payment of 7 per cent preferred dividends and 5 per cent dividends on common stock, there was a surplus of \$7,321,398.

The statement of the company is as follows:

		Decreases.
Net profits.....	\$15,521,398	\$563,422
Pfd. dividends.....	4,200,000	unch'ng'd
Balance for common.....	11,321,398	*563,422
Common dividends.....	4,000,000	*800,000
Surplus.....	7,321,398	1,363,422
Prev. surplus.....	16,069,549	11,315,180
Total surplus.....	23,390,947	12,678,602
Sur. transferred to cap-ital stock.....		20,000,000
Profit and loss sur... ..	23,390,947	*7,321,398
		*Increases.

Inventories of \$69,600,000 and receivables of nearly \$70,000,000 after deducting contingent reserves, are shown by the balance sheet. The total quick assets are \$145,418,354 against current liabilities, including notes of \$41,303,000, leaving a net working capital of \$103,235,783, an increase of \$6,187,786 over the previous year.

President Cyrus McCormick says in the report that foreign sales now represent 40 per cent of the business, having increased from \$10,400,000 in the year of organization to \$42,300,000 last year.

In a special letter to the shareholders along with the annual report, President McCormick says that the government case against the company is different from any of the other so-called trust cases. He says that the charges of misconduct have been disproved in other cases and that they will fail again because untrue. He quotes a decision of the Missouri supreme court in which it was found that the company had not used its power to oppress farmers.

METAL MARKETS
Tin Consumers Secure Price Concessions

New York

May 7.

Tin.—The monthly statistics at the end of April showed the general tin situation to be close to what the trade had anticipated. A decline of about 3,800 tons in visible supplies occurred during that month, and reduced the total visible supply of Europe and the United States to 11,893 tons. Stocks on dock and landing in this country increased at the expense of foreign supplies, the total on May 1, showing an increase of 1,004 tons compared with April 1. Although daily price changes here have been a close reflection of the London market, yet consumers have had no trouble in finding sellers willing to shade the cost to import the metal. The price at the end of the week is off about 1c per pound from the closing of April 30. Spot and May tin can be bought at from 45.50c to 45.75c, today. The London market

closed firm at £208 15s for spot and £204 10s for three months. Arrivals since May 1 aggregate 635 tons and there are 1,805 tons afloat.

Copper.—The general market is unchanged from last week. Fair size lots of electrolytic can be bought at from 15.80c to 15.90c, cash New York, and sales of lake are reported at 16c. There is not an important demand, neither are the leading producing interests pressing sales. The latter continue to quote lake at from 16.12½c to 16.25c, and electrolytic at

Spelter.—After declining a few points early in the month spelter displayed renewed firmness, and with no pressure to sell is held at 6.85c in New York for May-delivery.

Chicago

May 6.

New Metals.—The metal market has been fairly active during the past week, although prices show very little change. Spelter is high, but the

Merchant Stacks Produced Less Pig Iron in April

Total Output Was Smaller Than March, Yet the Daily Average Production Was Largest in Two Years

While the total production of coke and anthracite pig iron in the country in April was 34,035 tons less than in March, which had one more working day, yet the daily average production in April was larger by 1,459 tons than the daily average for March. The total output in April was 2,377,494 tons, compared with 2,411,529 tons in March. The daily average output in April was 79,250 tons, and in March 77,791 tons. The April daily average was the largest recorded for any month since April, 1910, the average for that month being 82,590 tons.

	1912.	1911.
January	66,220	58,989
February	72,372	63,617
March	77,791	69,863
April	79,250	68,163
May	60,367	59,109
June	59,109	57,294
July	61,995	65,797
August	65,797	67,486
September	67,486	66,637
October	66,637	65,558
November	65,558	
December		

The larger portion of the loss in production shown in April was due to the lessening activities of the merchant stacks. The total merchant iron produced in April was 529,132 tons, compared with 562,855 tons in March, making a loss in April of 33,723 tons. The steel works, or non-merchant furnaces produced almost identical tonnages in March and April, in April 1,834,176 tons and in March 1,834,218 tons, a difference of 42 tons.

The number of stacks active on the last day of April was 239, compared

with 237 active on the last day of March, making a net gain to the active list in April of two. Of the merchant stacks, in April two were relighted, while four were blown out, making a net loss of two. Of the steel works, or non-merchant stacks in April, five were relighted and one blew out, making a net gain to the steel works furnaces active for the month of four. In all, seven stacks were relighted and five were blown out during the month of April.

	1912.	1911.	1910.
January	2,052,806	1,766,658	2,599,995
February	2,098,796	1,781,285	2,429,525
March	2,411,529	2,165,764	2,588,736
April	2,377,494	2,044,904	2,477,700
May		1,871,388	2,374,802
June		1,773,282	2,288,279
July		1,776,108	2,158,124
August		1,921,832	2,103,792
September		1,973,918	2,048,461
October		2,092,061	2,086,205
November		1,999,100	1,910,385
December		2,032,301	1,779,899
Total	8,940,625	23,198,601	26,845,904

The production of spiegel in April was 3,179 tons, compared with 3,823 tons in March, a net loss in April of 644 tons. The total output of ferro in April was 11,007 tons, compared with 10,633 tons in March, making a net gain in April of 374 tons.

The plant of the New Process Steel Co., Marshall, Mich., will be sold by the receiver, the Detroit Trust Co., on May 12. The sale will be in either parcel or bulk, as bidders desire.

APRIL PIG IRON.

States.	No. of stacks.	No. in blast last day of month.		Total tonnage made.		—Totals.—	
		April	Mar.	Merchant.	Non-Merchant.	April	Mar.
Pennsylvania	156	101	100	142,051	866,874	1,014,925	1,039,277
Ohio	71	52	52	121,142	450,803	571,945	590,325
Alabama	45	18	18	101,950	49,640	151,590	149,938
Virginia	24	4	5	14,152	.....	14,152	20,365
New York	28	17	15	65,033	91,302	156,335	149,329
New Jersey	7	..	..	.....	.....	.....	.....
Illinois	24	19	18	20,796	209,877	230,673	209,186
Colorado	6	3	3	.....	.....	.....	.....
Indiana	10	9	8	.....	.....	.....	.....
Maryland	4	2	2	.....	.....	.....	.....
Wisconsin	6	4	4	24,902	152,061	176,963	173,832
Kentucky	7	1	1	.....	.....	.....	.....
West Virginia	4	2	3	.....	.....	.....	.....
Tennessee	18	6	7	.....	.....	.....	.....
Washington	1	..	..	24,106	13,619	37,725	54,783
Georgia	2	..	..	.....	.....	.....	.....
Texas	3	..	..	.....	.....	.....	.....
Minnesota	1	..	..	.....	.....	.....	.....
Michigan	3	1	1	.....	.....	.....	.....
Missouri	1	..	..	.....	.....	.....	.....
Spiegel—All states						3,179	3,823
Ferro—All states..						11,007	10,633
Totals	421	239	237	529,132	1,834,176	2,377,494	2,411,529

IMPORTANT TOPICS

Will be Discussed by American Iron and Steel Institute.

Both business and technical subjects are embraced in the official program of the second general meeting of the American Iron and Steel Institute to be held at New York City, Friday and Saturday, May 17 and 18, announcement of which has just been made. The papers and discussions upon the set topics will be presented at morning, afternoon and evening sessions on Friday the main day of the meeting, to be held at the Waldorf-Astoria. In the evening the banquet at the Waldorf-Astoria will take place. On Saturday, the members will visit various points of interest about the metropolis. The New York Central railroad has invited the members of the institute to inspect its extensive terminal improvements as its guests and a list of other matters of especial interest about the city is being prepared, which the visiting steel makers will visit as they so desire.

The official program is as follows:

First Session, 10:30 a. m.

Address of the president, Hon. Elbert H. Gary.

"Contract Obligations," E. A. S. Clarke, president, Lackawanna Steel Co., New York. Discussion by: Willis L. King, vice president, Jones & Laughlin Steel Co., Pittsburgh, James A. Farrell, president, United States Steel Corporation, New York, and others.

"Competition: Its Uses and Abuses," Joseph G. Butler Jr., vice president, Brier Hill Steel Co., Youngstown, O. Discussion by: John A. Topping, chairman, Republic Iron & Steel Co., New York; Charles M. Schwab, president, Bethlehem Steel Corporation, New York, and others.

Buffet Lunch.

Second Session, 1:30 p. m.

"Some Experiences in India," Julian Kennedy, consulting engineer, Pittsburgh.

"Electric Furnaces," William R. Walker, United States Steel Corporation, New York. Discussion by Theodore W. Robinson, vice president, Illinois Steel Co., Chicago; Eugene B. Clark, American Sintering Co., Chicago; S. T. Wellman, Wellman & Son, Cleveland.

"Corrosion of Steel and its Prevention," Dr. A. S. Cushman, Institute of Industrial Research, Washington, D. C. Discussion by: Louis J. Campbell, Youngstown Sheet & Tube Co., Youngstown, O.

"Metals and Alloys," Dr. John S. Unger, Carnegie Steel Co., Pittsburgh. Discussion by: George B. Waterhouse, Lackawanna Steel Co., Buffalo.

Third Session, 7:00 p. m.

Banquet at the Waldorf-Astoria Hotel.

Welfare Work: "Enforcement of Health Laws," Dr. Thomas Darlington; "Something Doing in Colorado," Dr. Richard W. Corwin, Denver; "Rendering Labor Safe," Raynal C. Bolling, New York.

"Mining Operations on Mesabi Range," William J. Olcott, Duluth. (Illustrated.)

Hearing of Evidence in Corporation Suit Begins

*Before Special Examiner Brown—Pool Lasted About a Minute After
Withdrawal of American Steel & Wire Co.—A Defective Memory*

New York, May 8 (By wire.)—Full details of the destruction of the minutes of the wire rope and electrical pools were brought out in hearings before Special Examiner Brown, Wednesday, the witness being Harry A. Whitney, formerly corresponding salesman for the American Steel & Wire Co., Worcester, Mass. Mr. Whitney stated that these records, which he had charge of were destroyed by himself by order of Frank Baackes, vice president and general manager of sales of the American Steel & Wire Co. He stated he wished he were not so sure of this fact, as Mr. Baackes had desired him to forget it.

The next witness called was William Derham, head of the wire specialties division of the United States Steel Products Co.

(By a Staff Correspondent.)

Before Henry P. Brown, of Philadelphia, sitting as special examiner at New York, the United States government, on Monday, May 6, began the presentation of evidence in support of its contentions set forth in its petition in equity that the United States Steel Corporation is a corporation in violation of the federal anti-trust laws and should be dissolved into its original constituent companies. The hearings are being held in the United States Custom House, New York. The taking of the evidence in the suit is expected to extend over a long term, as the present sitting in New York alone will probably continue for about two months.

Appearing as legal representatives for the government at the hearings, are: Special Counsel Jacob M. Dickinson, former secretary of war, and Henry E. Colton. For the defense, the attorneys at the examination are: Richard V. Lindabury and Raynal C. Bolling, of New York; David A. Reed, of Pittsburgh, and Cordenio A. Severance, of St. Paul. The witnesses summoned for the opening session included Frank Baackes, vice president and general sales agent of the American Steel & Wire Co., Chicago; T. H. Taylor, assistant general sales agent of the American Steel & Wire Co., New York; James

Gayley, formerly vice president of the United States Steel Corporation; Frank C. Newbury, of John A. Roebling's Sons Co., Trenton, N. J.; Geo. E. Holton, president and treasurer of the Bryden Horseshoe Co., Catasauqua, Pa., and Wallace Buell, Port Chester, N. Y., formerly general sales agent of the Washburn & Moen Mfg. Co., but now retired.

Examine Into Wire Pools

Monday's sessions were devoted almost exclusively to the taking of testimony regarding agreements and pools entered into by manufacturers of wire and wire products and horseshoes for the control of prices in these lines of manufacture. Mr. Buell, the first witness, stated that he knew of the existence of such agreements between the years 1892 and 1896, but that he had nothing to do with their inspection and execution and could only state from hearsay what companies participated. Mr. Buell's evidence furnished very little information on this point. On the inquiry of Mr. Dickinson, the witness had stated that he knew something regarding the affairs of the Tennessee Coal, Iron & Railroad Co. prior to its absorption by the Steel Corporation. On cross examination, Mr. Lindabury asked the witness to particularize along this line. Mr. Buell stated that in about 1902 overtures were made to him by officials of the Tennessee company that he consider becoming chairman of the board of directors, and that he had then made a cursory inspection of the company's property. He stated he then regarded the Tennessee company as a strong factor potentially in the iron and steel industry, needing only good management to make it a powerful competitor. He declared he had learned that the affairs of the company at that time were in an unsatisfactory condition. Pressed as to his source of information, the witness became obdurate, naming two men now dead, the late James Henry Smith and another. Mr. Lindabury at this juncture made a threat to report the witness for contempt of court. The witness was finally excused with instructions to refresh his memory on certain points as to the wire agreements and to reappear at the later time.

George E. Holton, president and treasurer of the Bryden Horseshoe Co., Catasauqua, Pa., was examined as to

the association for the control of prices among the horseshoe manufacturers. The witness stated that this association was formed in the spring of 1901 and continued until the spring of 1909. He said he had never read a copy of the agreement and the proceedings were delayed while he looked over what purported to be a copy of the agreement which Mr. Dickinson handed him. The supervisor of the pool, the witness said, was Edwin E. Jackson Jr., an attorney of New York City, through whom prices were fixed and penalties levied for violation of the rules. In making bids on government work, the rule that bids on government work should be designated by the supervisor was always disregarded, Mr. Holton stated. Several letters were introduced into the record by the government, to which objections were noted by the defense. These were letters which had passed between Mr. Holton and the supervisor concerning the operations of the pool. One told of the attempts that were being made to bring the Standard Horseshoe Co. and other concerns into the association and also how the association was paying \$750 monthly to a horseshoe manufacturing company that was in the hands of receivers in the expectation that this company would join the association after it had been cleared of its financial trouble.

Mr. Lindabury objected so strenuously to the government pursuing this line of inquiry that he called forth a sharp retort from Mr. Dickinson.

"I am accustomed to your objections and I'll not shrink from them, you will find," said the government counsel.

American Company Withdrew

On cross examination by Mr. Severance, Mr. Holton admitted that the breaking up of the horseshoe association was caused by the withdrawal of the American Steel & Wire Co. The witness said that Mr. Baackes, the representative of the American Steel & Wire Co., at one of the meetings had declared that Chairman Gary, of the Steel Corporation, had no knowledge of the American company's affiliation with the price pool. In reply to Mr. Severance's question, the witness said that he knew that the American Steel & Wire Co.'s withdrawal followed Judge Gary's discovery of the existence of the pool.

On re-examination, Mr. Dickinson

brought out the fact from Mr. Holton that following the breaking up of the pool, there were luncheon meetings of the manufacturers at the Railroad Club in New York, at which prices were discussed. Mr. Holton insisted, however, that there was no agreement. "We understood," he said, "what price each was making that day. We never all agreed."

Helped to Operate Pools

James J. Bailey, formerly in the office of Edwin J. Jackson Jr., was next called to the stand and questioned by Mr. Dickinson as to his knowledge of price pools and agreements which had been organized and operated under Mr. Jackson's supervision. Mr. Bailey admitted his knowledge of such pools and that he personally had been in charge of the horseshoe pool, acting as secretary. He stated that meetings were held monthly and admitted that Frank Baackes, T. B. Taylor and others were in attendance. Regarding the present whereabouts of Mr. Jackson, the witness asserted he knew nothing.

Mr. Dickinson read several letters from Bailey to the Bryden Horseshoe Co., in which the former designated prices which that company was to bid in on certain government contracts.

"How long did the pool last after the American Steel & Wire Co. withdrew?" asked Mr. Reed. "About a minute," replied the witness.

On re-direct examination, Mr. Dickinson questioned Mr. Bailey as to the purpose of the pool. "Was it to lower prices?" asked the attorney. "I do not know," replied the witness amidst laughter.

Plate Advance Expected

New York, May 8 (By wire.)—The daily rate of bookings of the United States Steel Corporation this month is in excess of April. The unfilled tonnage statement to be issued May 10 will show a gain of over 200,000 tons. Deliveries on plates are falling behind from 8 to 10 weeks, and \$1 advance is expected. Tin plate is about to be advanced to \$3.50 per box. Seamless tubes have been advanced \$3.

Line Pipe Order

Pittsburgh, Pa., May 8. (By wire.)—A leading interest has taken 25 miles of 8-inch steel line pipe for shipment to California. The pipe is to enter gas lines.

Tin plate is being quoted at \$3.40 per box for third quarter as a minimum.

LIBERAL BUYING

Of Cars and Rails—Many Inquiries Pending.

New York, May 8. (By wire.)—Rails and car purchases continue very liberal. It is estimated authoritatively that negotiations now pending are for 60,000 tons of rails and 200,000 cars. The Santa Fe has placed 7,000 cars additional with the American Car & Foundry Co., bringing its recent purchases up to over 11,000. The Chicago & Eastern Illinois is inquiring for from 3,000 to 6,000 and the Illinois Central for 1,250 cars. Recent large tonnages of car materials placed with mills by builders have been done at advances of \$2 to \$3. The St. Louis & San Francisco railroad has ordered 4,600 coal cars, 400 Hart convertible cars and 1,000 box cars from the American Car & Foundry Co.

In rails, Chicago & Eastern Illinois has placed 10,000 tons, the St. Louis & San Francisco 18,000, Soo Line 10,000, and the Missouri Pacific 6,500. An order for 65,000 recently announced is for the St. Paul. All this business went to Chicago mills.

The Harriman lines are in the market for a round rail tonnage for new construction. The Seaboard Air Line is out for 17,000 and the Atlantic Coast Line for about 15,000.

IRON AND STEEL DIVISION

Of Mining Institute is Formed—Important Papers Planned.

The council of the American Institute of Mining Engineers, at its meeting on April 26, established an iron and steel division to represent the interests of the institute in the mining and metallurgy of iron and steel. The activities of the division will be in charge of the following committee, upon which shall rest the responsibility of securing papers and discussions on iron and steel for the meetings of the institute: Charles Kirchhoff, chairman; Charles F. Rand, vice chairman; Bradley Stoughton, secretary (165 Broadway, New York City); John Birkinbine, James Gayley, Henry D. Hibbard, Henry M. Howe, Robert W. Hunt, Julian Kennedy, Charles K. Leith, Richard Moldenke, F. W. C. Schniewind, Leonard Waldo, William R. Webster, Felix A. Vogel and Joseph W. Richards.

Carr Addresses Foundrymen.—W. M. Carr, general superintendent of the Alloy-Steel Casting Co. of Wheel-

ing, W. Va., gave a very informal talk to the Pittsburgh Foundrymen's Association on Monday evening of this week on the "Development of Small Open-Hearth Furnaces for Steel Casting." Mr. Carr had a half dozen lantern slides showing the open-hearth of his own design capable of melting 4,000 pounds of metal at one heat with a total of four heats for every 24 hours.

ANNUAL CONVENTION

Of Iron, Steel and Tin Workers Has Opened.

The annual convention of the Amalgamated Association of Iron, Steel and Tin Workers opened at the Masonic Temple, Chicago, May 7. The usual number of delegates were present. This is the first convention to be presided over by John Williams, who has been elected to the presidency to fill the vacancy caused by the resignation of P. J. McArdle, who became a salaried city councilman of Pittsburgh.

Half of the opening day's session of the convention was devoted to addresses of welcome by prominent labor leaders and others. John Fitzpatrick was among the speakers. The first business of the convention was transacted Wednesday. It was of routine character.

The convention will continue for at least two weeks and it will be ten days before the matter of wages or working conditions will come up for discussion. Definite details regarding the program have not yet been announced, but there may be some changes asked in working conditions.

The Sons of Vulcan met in annual convention, Tuesday, at Youngstown, O. This union of puddlers is considering the proposition of making a flat scale of \$6 per ton instead of the present sliding scale. The Vulcans are also much disturbed over the slow growth of their organization.

Riter-Conley Changes

The Riter-Conley Mfg. Co., of Pittsburgh, has announced the sale of the buildings and grounds of what is known as its Allegheny shops, on Preble avenue, North Side, and will remove its equipment, and also enlarge its Leetsdale, Pa., plant with entirely new equipment at once. In addition, the company will remove its general offices, including its drafting department and all executive officials, to Leetsdale. The change is significant of the rapid growth of this company.

A New Blast Furnace for the Inland Steel Co.

Description of Madeline Stack No. 2 With Details of the Ore Storage and Gas Cleaning Plant

The Inland Steel Co., Chicago, has recently blown-in a second blast furnace at its Indiana Harbor plant, known as Madeline No. 2. The new stack goes into service almost exactly four and a half years from the date when the original furnace began to produce pig iron. The decision to build the new stack was reached about a year ago, its construction being made necessary by the increasing demands for pig metal at the Indiana Harbor plant. The old furnace has been producing 400 tons per day for some time, but the eight open-hearth furnaces now in operation provide a steel-making capacity of from 1,100 to 1,200 tons daily. The discrepancy in the supply of pig iron is apparent from these figures and for nearly two years the Inland Steel Co. has been a heavy buyer of basic. Although market conditions have been exceptionally favorable to this policy, the low price of steel has militated against the ex-

tremely favorable quotations that have prevailed on pig iron and, furthermore, the purchase of pig iron from outside plants means a loss in the economy obtained through the use of hot metal. Also, the Inland Steel Co. has persistently pursued the policy of having a self-contained organization not dependent on outside sources for its raw material.

Improved Features of Construction

The new furnace, although similar in its general features to the older one, has a number of improvements and is slightly larger. The old stack is 85 feet in height from the hearth level and 20 feet 6 inches in diameter at the bosh. The new furnace is 90 feet in height, but of the same bosh diameter; also five stoves have been built in connection with the new furnace, making nine available for the two stacks. Liberal additions have

been made to the steam-making and power plant capacity, thus providing plenty of spare units which will insure the plant against accidental interruptions to its operation.

The new furnace is located 366 feet north of the first stack. The center line connecting the two stacks lies north and south, parallel to the harbor, the nine stoves being placed in a row between the furnaces. The boiler house and power station are situated east of and parallel to the line of stoves, as indicated in Fig. 8.

The ore storage and handling arrangements are clearly indicated in Fig. 8 and have not been changed since the original installation, which was described in THE IRON TRADE REVIEW, January 16, 1908. The dock frontage is 1,000 feet and the ore is taken direct from boats to the storage piles or bins, two unloading bridges being employed. The ore bins and scale cars are of the same general

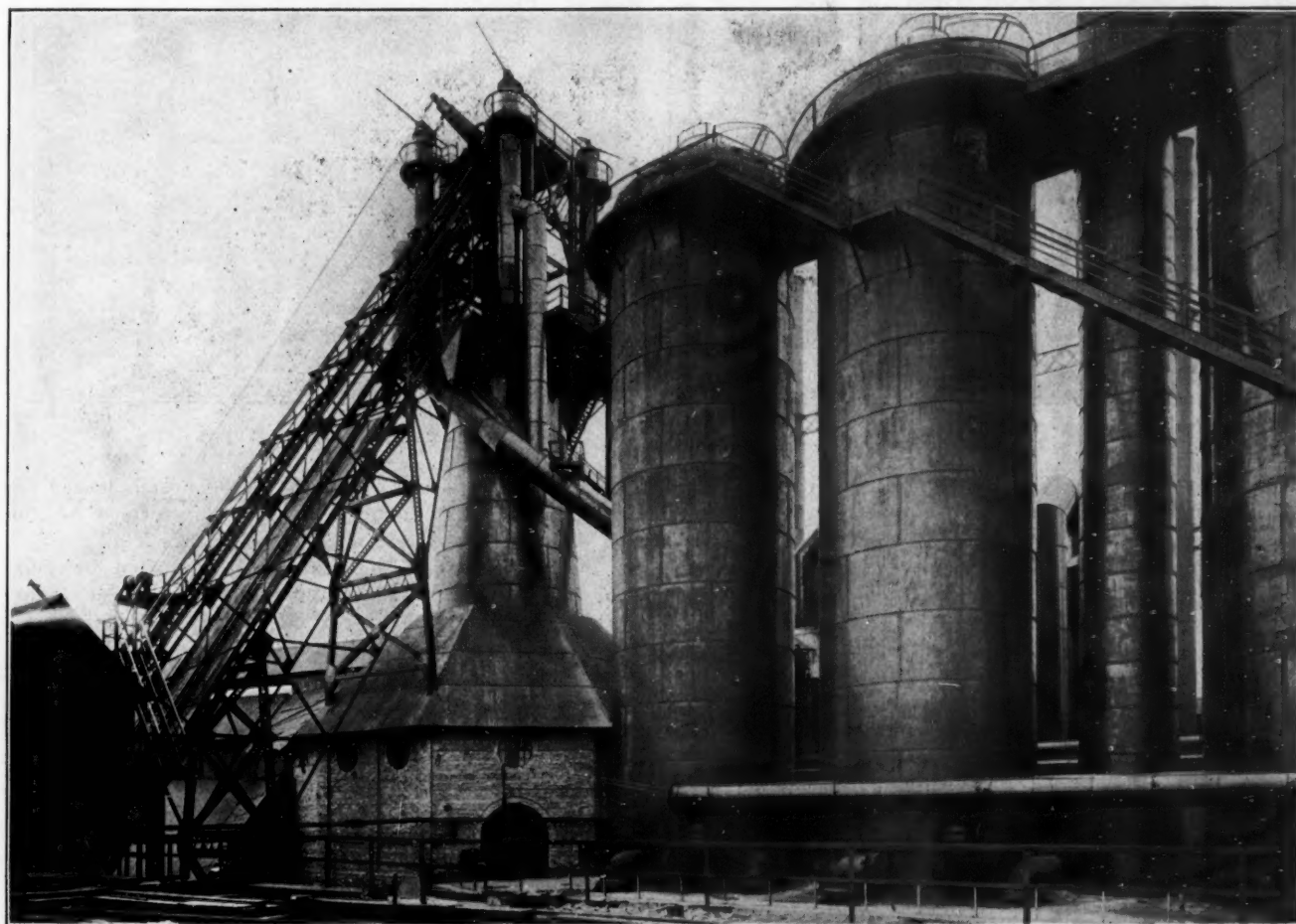


FIG. 1—GENERAL VIEW OF THE INLAND STEEL CO.'S NEW BLAST FURNACE PLANT

type as those at the central plant of the American Steel & Wire Co., Cleveland. The ore yard has an approximate capacity of 500 tons per running foot. The front shear leg of the unloading machine runs on rails placed at 80 feet from the face of the dock. A cantilever covers the bins and the equipment is so arranged that there need be but a single handling of the ore from the stock pile to the furnace. The steel stock bins for carrying the ore, limestone and coke and delivering it to the larries, which in turn deposit the material in the skip hoists, are all of a simple and inexpensive type which has been found very satisfactory after years of service in a number of other plants. The coke

Tracks at the yard level extend parallel to each side of the furnace plant and a service track is also laid between the boiler house and engine houses. The hot metal from the furnaces is transferred through the sub-way under the Lake Shore & Michigan Southern railroad to the steel plant.

The Stack

A general view of the new furnace with its stoves, including the skip bridge, is shown in Fig. 1, and Fig. 4 gives the lines and principal dimensions of the stack itself. The distance from the ground level to the top of the skip bridge is 139 feet, while that along the bridge from the center of

furnace proper, the distance is 95 feet, 2 inches. At the hearth the furnace is 14 feet 6 inches in diameter, expanding to 20 feet 6 inches in the bosh and again contracting to 15 feet at the top. For a distance of 7 feet 7 inches at the bosh the interior of the furnace is cylindrical. The lining at the bosh is 4 feet 10½ inches thick, tapering to approximately 36 inches at the top, while at the hearth it is 3 feet 9 inches. By cutting down the thickness of the lining the capacity of the furnace may be increased to 500 tons per day. The cinder notch is 4 feet 6 inches above the hearth level, and the center line of tuyeres is 7 feet 6 inches from the same point. The bustle pipe, which is 30 inches inside diameter, is hung

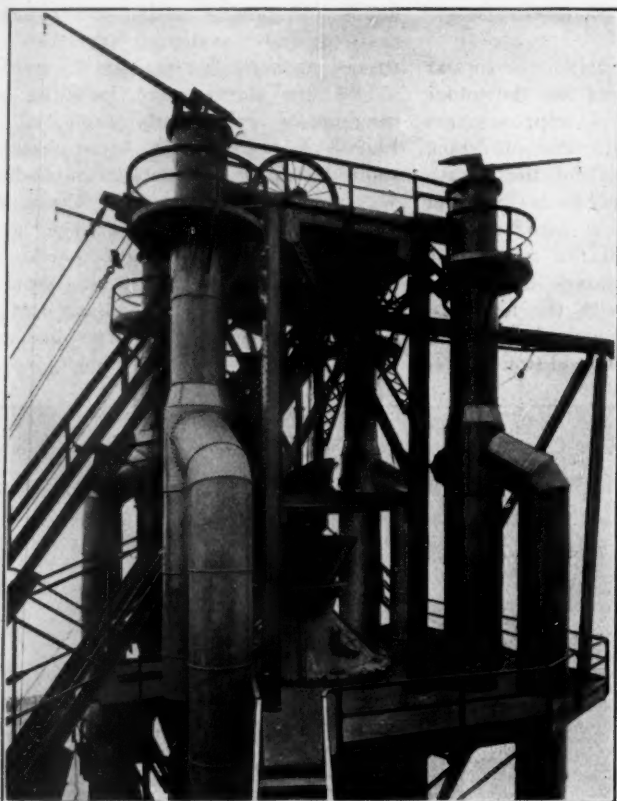


FIG. 2—THE FURNACE TOP

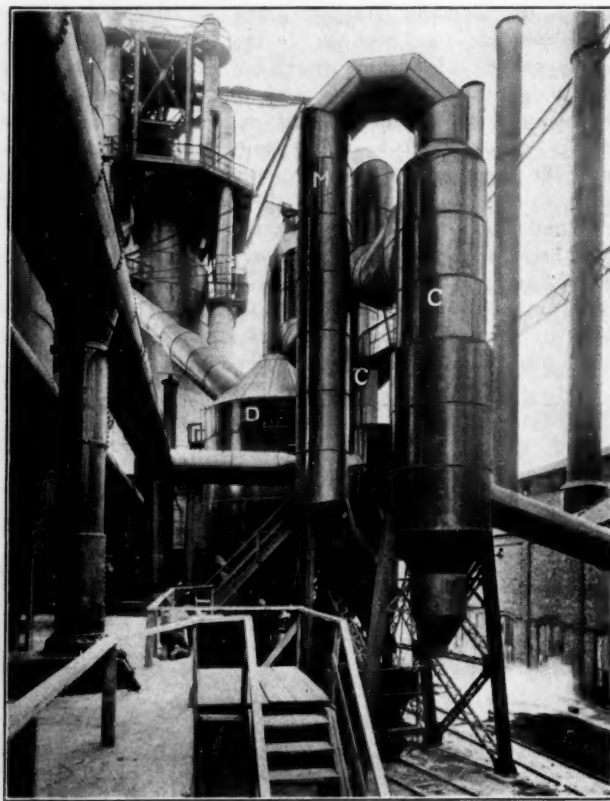


FIG. 3—GAS CLEANING APPARATUS

bins, 60 feet long, have two doors, one feeding directly into each skip car. The bin system is covered by a three-track, steel trestle connected with the general railroad system of the plant. There are 20 ore and limestone bins for the two furnaces, occupying a space of 305 feet between the two coke bins. They deliver the material directly to electrically-operated scale cars of 10 tons capacity. The ore bins are filled either directly from the stock pile by the bridges or through the use of a 30-ton electric transfer car operating along the trestle which extends the entire length of the stockyard.

Fig. 8 clearly shows the railroad facilities at the blast furnace plant.

the top sheave to the center of the hoisting drum is approximately 135 feet. The skip bridge itself is entirely self-supporting, none of its weight being carried by the furnace. The framing of the bridge is clearly shown in Fig. 1, the upper portion being carried as a cantilever. The hoist house in connection with the old furnace is placed under the bridge, but at the new stack it is situated immediately over the lower end of the bridge; this arrangement simplifies the cable leads. Each bridge carries two skip buckets, which are operated in balance by a 14 x 14-inch, steam-driven, double drum hoist.

From the foot of the columns supporting the mantle to the top of the

12½ feet above the hearth level. The diameter of the ring formed by this pipe is 36 feet 3 inches.

The mantle is supported by eight cast iron columns, each 26 feet 5 inches in length, so spaced as to permit the proper introduction of 12 tuyeres. The general arrangement of the furnace below the mantle is shown in Fig. 6, while Fig. 5 gives a detailed view of the bosh, cooling blocks and tuyere arrangements. The bustle pipe, as indicated in Fig. 6, is simply suspended by iron straps and rods from brackets at the top of the columns. This construction is practically self-centering and automatically takes care of any expansion or contraction.

The bosh is cooled by eight rows of

removable water blocks, the details of which are shown in Fig. 5. There is also one row of removable water blocks below the tuyeres and the spaces between adjacent tuyeres are each protected by two removable water blocks. This illustration also indicates the construction of the leg pipe, blow pipe and tuyeres. The latter are so arranged that they may be easily and quickly removed and as indicated, keys are used in place of nuts wherever possible. In addition to the cooling blocks in the bosh, the

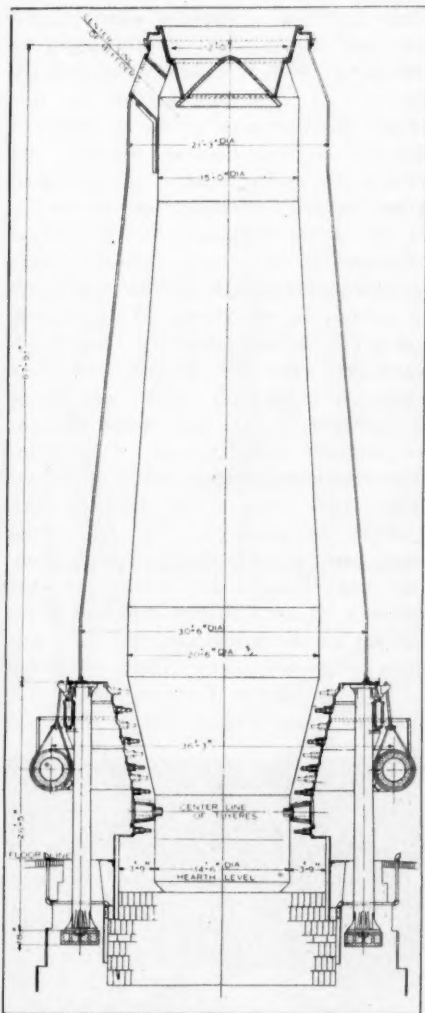


FIG. 4—SECTIONAL VIEW OF THE NEW BLAST FURNACE

hearth is also amply cooled by cast iron, water-cooled plates set vertically inside the hearth jacket.

The top of the new furnace, Fig. 2, is similar in its general arrangement to the design of the No. 1 furnace. A McKee, 6-point, revolving distributor is used, although the design has been slightly modified to meet individual conditions. The skip hoist drops its load into an oval thimble or funnel which in turn guides the material to the hopper of the distributor. The object of this arrangement is to

insure good distribution in case the rotating mechanism of the distributor should be inoperative. The arrangement of the bleeder valves, the top platform and upper framing of the skip bridge is clearly indicated in Fig. 4.

The cast house is a steel frame structure with steel roof and siding. It is approximately 100 feet long and 25 feet wide and is served by a 15-ton Alliance crane. The sides are so arranged as to shelter the ladle cars on the tracks below. The cast house roof is self-supporting and does not come in contact with the shell of the furnace.

The gas leaves the furnace through four uptakes which converge into two downcomers connecting in turn with the large dust catcher, *D*, Fig. 3. Leaving it, the gas successively passes through two Brassert-Witting centrifugal cleaners, *C*, and leaves the final cleaner through the main, *M*, which communicates with the service main leading to the boiler house and stoves. The construction of the Brassert-Witting centrifugal cleaners is rather interesting. They are circular in cross-section and the gas enters tangentially at the top. Parallel vertical Z-bars are riveted to the interior of the first cleaner, while in the second, angles replace the Z-bars. The whirling gases strike the baffles thus formed and deposit most of the dust which is being carried. The dust catchers are mounted on structural steel frames at such a height that their contents may be discharged directly into a car standing on the track beneath, as indicated in Fig. 3.

The new furnace is equipped with five 2-pass, side combustion stoves, one of which is so arranged as to be used either with the old or new furnace. Each stove is 93 feet in height and 24 feet in diameter inside of shell. The diameter of the new stoves is 2 feet larger than the old ones. The shell is lined with 13½ inches of second quality fire brick, while an additional 9 inches of first quality fire brick protects the combustion chamber. The checker passages are 6 x 9 inches in cross-section, the checker bricks being 4½ inches wide. The top of the stove is lined with two layers of nine-inch fire brick properly wedged so that the dome is self-supporting.

In connection with these stoves a chimney valve of rather unusual and interesting design has been installed. This is shown in detail in Fig. 7, and consists of a 30-inch spiral elbow which rotates easily on ball bearings placed under the flange, *F*. The elbow moves very easily and can be

swung out of the way by one man. Its spiral shape and off-set position is such that the valve seats squarely. When the elbow has been swung away from the thimble communicating with the stove, thus disconnecting the chimney, the opening into the stove is closed by the cover, *C*, the latter being suspended from the trolley, *T*. This valve is very economical in construction and exceedingly simple in operation. There is one gas inlet and two chimney valves for each stove.

The steam-making capacity of the plant has been augmented by the addition of eight new 500-horsepower Sterling water tube boilers, making the total capacity of the plant 8,000 boiler horsepower. Five Epping-Carpenter duplex pressure pumps, 14 x 8 x 16 inches, supply the boilers with

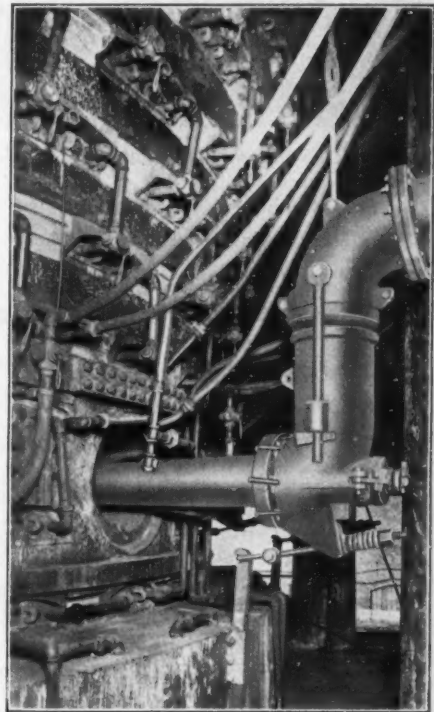


FIG. 5—TUYERE AND BOSH DETAILS

water, first passing it through Cochran feed water heaters. The boilers are fired with gas from the blast furnaces. Service water for the plant is provided by two 4,000,000-gallon and two 5,000,000-gallon compound, duplex outside packed Epping-Carpenter plunger pumps. The two 5,000,000-gallon pumps are new, the others having been in service since the installation of the first furnace. There is now sufficient pump capacity to hold one unit in reserve. Two additional 44 x 84 x 60-inch vertical, long, cross-head Allis-Chalmers blowing engine units have been installed and one additional 84 x 84 x 60-inch unit, making seven units in all. Three units are used for supplying the blast to each furnace and one is reserved as a spare.

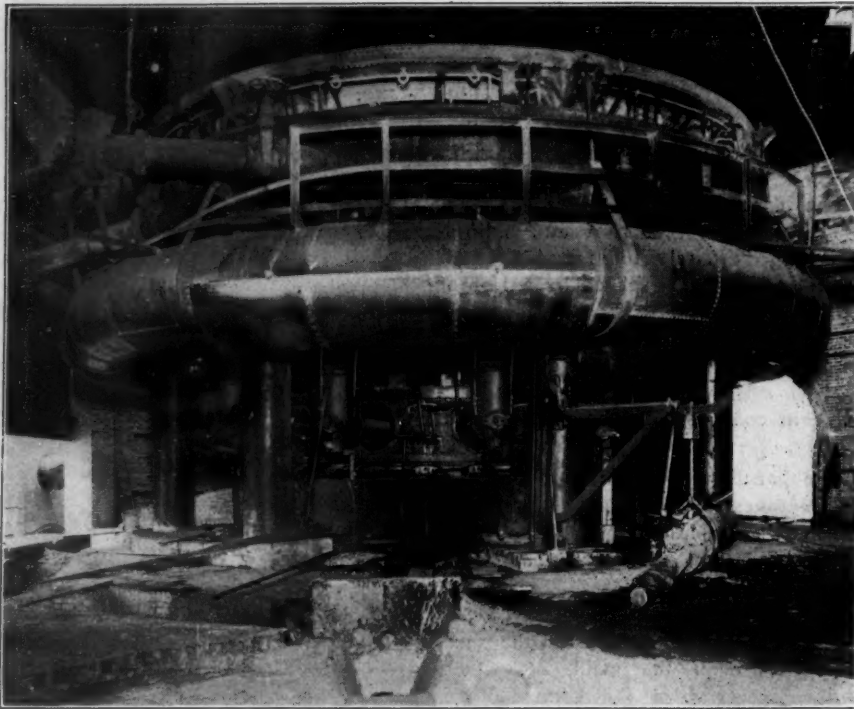


FIG. 6—BOSH, SHOWING BUSILE PIPE AND TAP HOLE

The new blowing engine equipment is a duplicate of that installed in 1908. These engines are designed to run either singly or in compound condensing pairs. The steam may pass through a reducing valve when the low pressure side is running singly. The blowing engine house is served by a 25-ton crane. The electrical capacity of the plant has been increased by the addition of two new 550-kilowatt, 250-volt generating units. Each new unit comprises an Allis-Chalmers, Corliss cross-compound engine and a General Electric generator. The engine cylinders are 20 and 42 inches in diameter by 42 inches stroke. From the foregoing it is seen that the additional power plant capacity required by the new furnace has been obtained simply by adding units similar to those already installed. This insures uniformity in equipment and simplifies the operating problem.

The new blast furnace was designed and erected by the Inland Steel Co. under the direction of John W. Lees, general superintendent, Allen Strale, chief engineer, and J. E. Thropp Jr., blast furnace superintendent. The plate work on the furnace, stoves, etc., was handled by John Mohr & Sons, Chicago. The ore bins were built by the McClintic-Marshall Construction Co., Pittsburgh, and the Hansel-Elcock Co., Chicago, had the contract for the structural work in the buildings. The bricks used in the linings were manufactured by the Harbison-Walker Refractories Co., Pittsburgh.

The Utilization of Fine Iron Ores

Considerable progress has been made in perfecting processes for the concentration of low-grade ores, states the *Iron and Coal Trades Review*. In all of these processes it is necessary that the ore should be finely ground before the impurities can be removed. The resulting concentrated material being in a fine state of sub-division is unsuited for use in the blast furnace, and it is necessary that it be formed into compact masses by me-

chanical means, before it can be smelted. One of the first methods adopted for this purpose was to mix the fine ore with a binder such as clay, and afterwards to mold the plastic material into blocks or briquettes by hand, which were then dried and roasted. This process, however, on account of excessive cost, has been entirely superseded. The coal consumption often reached from 25 to 30 per cent of the weight of the briquettes produced. In addition, the process was a lengthy one, extending from 10 to 12 days from the time the raw materials were passed into the pug mill to the unloading of the kiln, with correspondingly high labor costs. An improvement on this crude method was to form the briquettes by mechanical means, and afterwards roast them in gas-fired kilns, which consisted of as many as 20 or 30 chambers in connection arranged so that each chamber could be isolated to facilitate the operation of loading or unloading. This process being continuous possessed several advantages over the earlier one, and although somewhat slow, was more economical of fuel, and more efficient as regards the removal of sulphur. The labor charges were, however, high, and quite frequently the briquettes collapsed in the kiln from their own weight, causing much trouble and double the work. Another process of an entirely different type, known as the nodulizing process, was then perfected. The plant consisted of a long tubular furnace, 100 to 125 feet in length and from 7 to 10

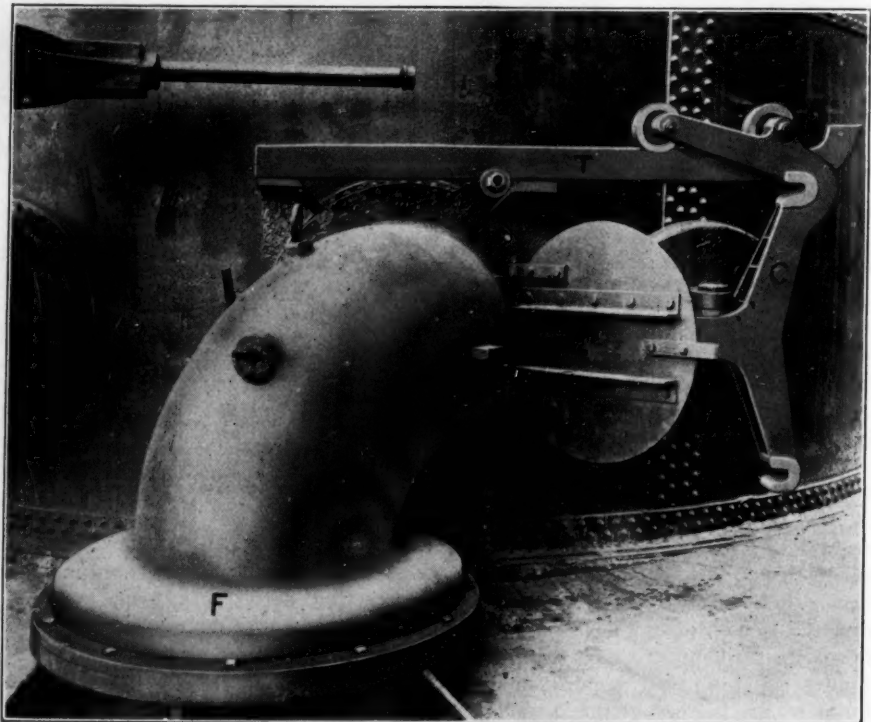


FIG. 7—ONE OF THE ROTATING CHIMNEY VALVES

feet inside diameter. The tube was mounted on rollers and set at an incline of about 1 in 10, and was heated by means of gas introduced at the lower end. The material was fed from a hopper at the upper end of the furnace, and as it slid down the tube was formed into nodules by the heat and the motion combined. At the lower end of the furnace the temperature was sufficiently high to sinter the nodules, forming a hard porous product, capable of absorbing 6 per cent of their weight in water. The sulphur was reduced to about 0.1 per cent, a figure considered high by blast furnace managers. The production of a furnace 7 feet in diame-

binding material. The material is delivered from hoppers into presses, where it is squeezed into briquettes about 6 inches x 6 inches x 3 inches, at the rate of about 14 or 15 per minute for each man loading. The briquettes are removed from the press tables to cars on which they are stacked in two layers, and are conveyed by an industrial track to tunnel-shaped kilns, where they are subjected to a temperature of about 1,450 degrees Cent (2,642 degrees Fahr.). In order to withstand this temperature without injury the cars are equipped with fire brick covered platforms and fire brick curtained sides. They are fitted with graphite lubri-

rising from about 9 to 18 inches. This forms the combustion chamber, to which a mixture of producer gas and air is conducted through suitable ports, and is burnt in a long flame which extends from a distance of about 30 feet along and between the briquettes. Draft is provided by a stack connected by flues to the entrance end of the kilns. The air for combustion is blown in by a fan through a chamber having a bottom of cast iron plates, forming the roof at the discharge end of the kiln. The air is thus heated at the expense of the roasted briquettes, so that the process is to a considerable extent regenerative. When the plant is work-

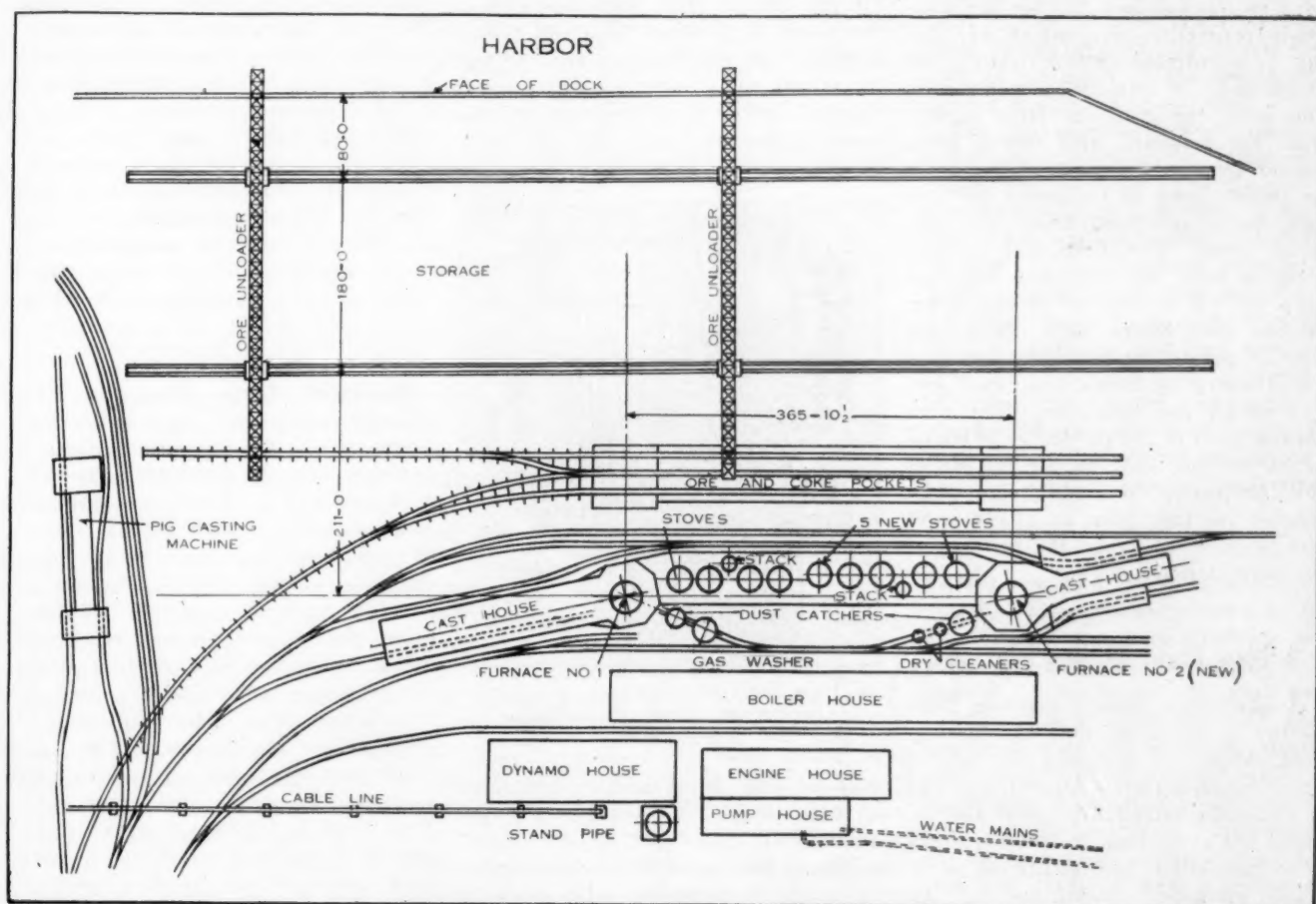


FIG. 8—PLAN OF THE INLAND STEEL CO.'S BLAST FURNACE PLANT, SHOWING THE OLD AND NEW STACKS

ter averaged 100 tons of nodules per 24 hours, but the great drawback of the system is that in addition to a high initial cost, stoppages are very frequent owing to the choking of the tube by the massing of nodules on the lining, which would break away and damage it, or render it necessary to cool the furnace so that it could be cleaned and repaired, which required a lengthy shut-down.

A method of briquetting free from the difficulties of the earlier systems is known as the Grondal process. In this process the material is formed into briquettes by mechanical pressure, without the addition of any

cated bearings, and the wheels are protected from the hot gases by a steel curtain which hangs lower than the fire brick sides, and as the car enters the kiln, the curtain dips into sand carried in angle iron troughs running the entire length of the kilns.

The latter are from 150 to 200 feet in length, and sufficiently wide to allow the cars to pass in with a minimum clearance of about 2 inches between the sides, to retain the hot gases as the cars enter the kiln. In the roof of the kiln baffles are placed for about two-thirds of its length from the entrance, and the roof slopes upwards above the tops of the briquettes

ing the kilns are filled by a continuous row of cars abutting together end to end. The cars are passed into the kilns at the rate of about three per hour, by means of a push car actuated by an endless chain revolving in the center of the track outside of the kiln. As one car enters, a car leaves the kiln at the other end, and is taken to a suitable position on the return track for unloading, after which the empty car is returned to the presses to be reloaded. The briquettes, owing to the reducing nature of the flame and the free draft, have an extremely low sulphur content, usually ranging below 0.05 per cent, and the iron exists in-

variably in the hematite form, qualities that are very desirable. The porosity appears to be about 15 per cent, and little trouble is experienced from disintegration during transit, a fault that is frequently found when briquettes are not roasted at a sufficiently high and uniform temperature. The process is a continuous one, the time required to finish briquettes from the raw material being roughly eight hours. Single kilns have been constructed, having a capacity from 30 to 130 tons per 24 hours.

It is estimated that the yearly output of briquettes by this process amounts to over 1,000,000 tons per annum, which represents at least 650,000 tons of pig iron. The materials used in Norway and Sweden are low-grade magnetite ores, which are being concentrated magnetically and briquetted. In England, purple ore or blue billy, the iron containing residue from the sulphuric acid works using copper pyrites, is employed, as much as 180,000 tons of briquettes per annum being produced from this material alone. The first cost of the plant is high, but the labor and upkeep are low in view of its simplicity. In one case where from 130 to 140 tons of purple ore briquettes are produced every 24 hours, nine men and a foreman are employed. The coal consumption in the producers is stated to be $8\frac{1}{2}$ per cent of the weight of the briquettes produced. The briquettes are free from fins, and sufficiently hard to carry the burden of the blast furnace.

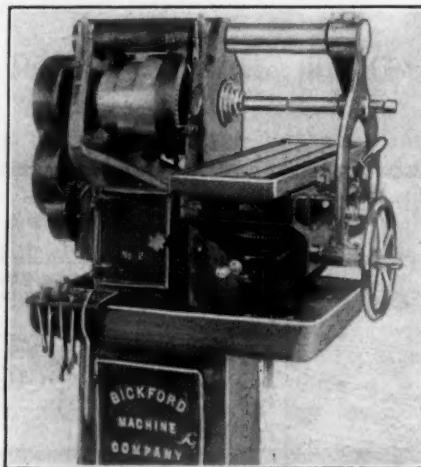
A New Plain Milling Machine

A new plain milling machine, built by the Bickford Machine Co., Springfield, Mass., is designed for use in plain manufacturing operations and is especially intended to meet the demand for a machine in which rigidity of construction and ability to withstand vibration compensate for the lack of some of the movements of the universal milling machine. This machine, shown in the accompanying illustration, embodies several new features. The knee and saddle are cast solid, thus providing a rigid table bearing, 8 x 24 inches. The feed is of the rack and pinion type and the rack, which is 6-pitch, may be provided with $1\frac{3}{8}$ -inch face in any desired length. By means of a special clutch and gear device inside the knee, the hand wheel at the side of the machine may control the motions of both the knee and the table.

The bearings, in which the spindle operates, are of phosphor bronze. The front bearing is provided with a

taper hole which, with the aid of a special clamp collar, provides against end motion in the spindle. This bearing may be carried a distance of $\frac{3}{4}$ inch through the main housing, to which it is splined and held by a large nut at either end. The front end also carries a graduated collar provided with a clamp screw in order that it may be set back to zero from any position. The pulley, which runs free on the spindle, carries a small gear which drives the back shaft; the latter, in turn, drives the main gear on the spindle, the power ratio being 6 to 1.

The feed is derived from the pinion shaft by means of a worm of coarse pitch in mesh with a very large gear on the shaft. The end pressure of the worm is absorbed by a ball thrust bearing. All feed changes are effected by means of a lever which is commanded by a door opening in the front of the machine. This gear box provides for 10 different feeds for



A NEW PLAIN MILLING MACHINE
BUILT BY THE BICKFORD
MACHINE CO.

each of the three spindle speeds, or a total of 30 feed changes for the machine.

The pulley is held to its position by means of a spring collar between one end and the main driving gear. The pulley cones are $7\frac{1}{2}$, 9 and $10\frac{1}{2}$ inches in diameter and carry a $2\frac{1}{2}$ -inch belt. The overhanging arm is of steel, $3\frac{1}{4}$ inches in diameter. The drop arm and braces are cast solid. The table, which has a surface, $10\frac{3}{4}$ x 34 inches, has two slots for T bolts. It is provided with a deep oil channel clear around the platen, $7\frac{1}{4}$ x $29\frac{1}{2}$ inches. The oil pan is provided with loose splashers which allow the overflow of oil to collect in a tank in the base, whence it is put in circulation by a gear pump on the rear of the machine. The machine, as shown in the illustration, weighs 1,750 pounds.

Steel Casting Plant at Panama

A new steel casting plant has been recently added to the mechanical division equipment at the Gorgona shops, Canal Zone. The purpose of this installation primarily is for the manufacture of steel castings as they are required in Panama canal construction work and to prevent the accumulation of cast steel repair parts in stock by the quartermaster's department. An investigation of the amount of steel castings ordered, and other parts now being made of cast iron, which, if made of steel would be more economical, proved that the commission can manufacture steel castings at no greater cost than is charged for them in the United States. The new equipment consists of a 2-ton Tropenas converter equipped with the usual high pressure blower, driven by a 75-horsepower motor; a double roller sand crusher and mixer, a 4-ton crane ladle, two 2-ton crane ladles, eight 150-pound hand ladles and two fuel oil ladle heaters. The iron for the converters is melted in two 10-ton cupolas and a 25-ton overhead crane has been installed for handling ladles, large molds and castings.

Purchases Large Shears. — The Youngstown Sheet & Tube Co., Youngstown, O., recently closed a contract with the United Engineering & Foundry Co., Pittsburgh, for one steam-hydraulic down-cutting shear. It is designed to operate on the same principle as the United Engineering standard type of high-speed forging press, the shearing power being obtained by means of expanding steam in an intensifier cylinder, which in turn forces water under a pressure of 5,000 pounds per square inch into the shear cylinder. All operations are controlled by means of a single lever. The shear is to have a capacity for cutting 20 x 20-inch sections, as well as 7 x 42-inch slabs, with a speed of 20 cuts per minute. The Youngstown Sheet & Tube Co. also placed an order with the same concern for one hydraulic bloom shear of the usual down-cut type, designed for a working pressure of 600 pounds per square inch, with a capacity for cutting 10 x 10-inch sections. These shears will be used in connection with the new blooming mill now under construction.

The Union Iron Works, San Francisco, has been given the contract for replacing plates on the Associated Oil Co.'s steamer Rosecrans, wrecked recently, the cost of repairs being fixed at \$70,000.

Investigation of the Corrosion of Iron and Steel

Results Reported at the Meeting of the Iron and Steel Institute—Welding Blowholes in Steel Ingots

At the May meeting of the Iron and Steel Institute of Great Britain, held at London, Eng., a symposium of three papers was presented on the corrosion of iron and steel. C. Chappell, of Sheffield, discussed "The Influence of Carbon on the Corrodibility of Iron." While the subject of the corrosion of iron and steel has been receiving increasing attention during the past few years, it has been found difficult to obtain reliable information as to the specific influence exerted upon the corrosion of these metals by varying proportions of alloying elements. In view of the prime importance of carbon in the metallurgy of steel, the investigations conducted by Mr. Chappell were directed toward ascertaining the affect of increasing the percentages of carbon on the corrodibility of steel.

Treatment of Different Steels

The steels tested were manufactured by the crucible process in the metallurgical department of the University of Sheffield. Six ingots were cast, varying from 36 to 40 pounds in weight and the carbon contents ranged from 0.10 to 0.96 per cent. The materials employed consisted of Swedish bar iron and charcoal. Each ingot was rolled down so as to give about 4 feet of $\frac{3}{4}$ inch round bar, and the remainder was rolled to a diameter of $\frac{5}{8}$ inch. The bars were subjected to six different methods of treatment. Test bars were turned from the $\frac{5}{8}$ inch round bars as received from the mill. This was characterized as the *rolled treatment*. *Normalizing* consisted of treating the $\frac{5}{8}$ inch bars in a large gas muffle. The bars were put in when the muffle was at a temperature of 800 degrees Cent., and then the temperature of the muffle was reduced to about 600 degrees Cent. and gradually increased to 900 degrees Cent. The bars were removed after being subjected to this temperature for about 20 minutes and were allowed to cool in the air. *Annealing* consisted of treating the bars in a coal-fired furnace and the $\frac{3}{4}$ inch round bars were employed so that the decarbonized skin could be completely machined-off in preparing the test pieces. The *quenching* treatment consisted of heating the bars in a salt bath furnace to 800 degrees Cent., and

they were allowed to remain at this temperature for 15 minutes and then rapidly quenched in water at 15 degrees Cent.

Test bars $4\frac{1}{2}$ inches long and $\frac{3}{8}$ inch in diameter were prepared from each steel at all stages of treatment. The bars, after being polished, were immersed in jars containing sea water for a period of 91 days. They were then removed, cleaned and weighed and were then re-immersed in the same jars for a period of 75 days.

Results of Tests

It was found that in rolled, normalized and annealed steels the corrodibility rises with the carbon contents to a maximum at saturation—0.89 per cent carbon—and falls with a further increase of carbon beyond this point. In quenched and tempered steel a continuous rise in corrodibility occurs with the increase of carbon within the range investigated, no maximum corrodibility at the saturation point having been found in these steels.

It also was discovered that quenching increases the corrodibility to a maximum while annealing has a tendency to reduce it to a minimum. Normalizing gave intermediate values, while the influence of tempering, it was found, varies with the tempering temperature.

These investigations also showed that the influence of time on the rate of corrosion varies with different steels. In a low carbon steel corrodibility is practically directly proportional to the length of immersion. The addition of 3 per cent of tungsten produced practically no change in the corrodibility of carbon steels. It was found, however, that decarbonization increases the resistance to carbon.

Corrosion of Nickel and Chromium Steels

A joint paper by J. Newton Friend, J. Lloyd Bentley and Walter West, entitled, "The Corrosion of Nickel, Chromium, and Nickel-Chromium Steels" was read. In introducing the subject it was stated that the corrodibility of steel may be influenced in at least three different ways by the introduction of foreign elements. A few elements, such as carbon, nickel and

silicon, yield compounds which offer a stout resistance to oxidation and thus greatly enhance the stability of the metal toward corroding influences.

Some elements yield readily fusible alloys or compounds of variable melting points, during solidification which cause segregation, one of the most serious causes of galvanic activity and pitting. Furthermore, a few elements, such as sulphur, when present in steel exist in the form of relatively oxidizable bodies and greatly enhance the rate of corrosion of the metal when once it has begun.

The investigations were made to thoroughly ascertain the influence of nickel and likewise to study that of chromium and of a mixture of nickel and chromium upon the corrodibility of steel. The test pieces were in the form of discs which were laid flat on a circular sheet of paraffine wax in a glass crystallizing dish and were covered with fresh water for a period of 64 days. Sea water tests and sulphuric acid tests also were made. The latter two tests covered periods of 60 and 53 days' exposure, respectively.

Acceleration Tests

As a result of the tests it was concluded that acceleration tests, as usually carried out with sulphuric acid, yield very misleading results as to the general corrodibility of the metal tested. It was found that two standard steels corroded at almost identical rates when exposed to fresh water, sea water and a solution containing 0.05 per cent sulphuric acid. However, in the 0.5 per cent sulphuric acid solution one grade of steel corroded two and one-half times as rapidly as another. It was found that nickel steels appeared to be resistant to acid and neutral corroding metals alike. The resistivity increases with the percentage of nickel. The necessity of determining the corrosion of iron and steel under conditions closely similar to those to which the metal will be subjected in practice was urged as the result of these investigations.

"The Mechanism of Corrosion" was the subject of another joint paper by J. Newton Friend, J. Lloyd Bentley and Walter West. As a result of these investigations it was found that steel plates exposed to the light rusted more rapidly than those in the dark

and an appreciable amount of ferrous oxide is produced by prolonged exposure to daylight. No appreciable quantities of ferrous oxide are produced in the dark. It was concluded that light not only accelerates the oxidation of ferrous iron to ferric, but it has a more pronounced accelerating influence on the initial oxidation of metallic iron.

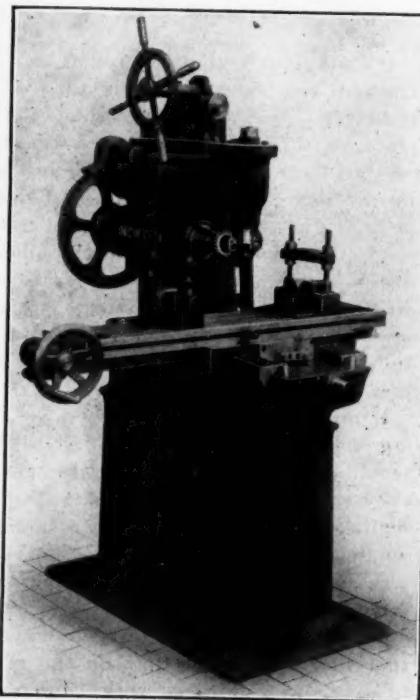
"The Welding of Blow-Holes and Cavities in Steel Ingots" was discussed by J. E. Stead. The steel contained 0.5 per cent of carbon and was made by the crucible process. Two steel ingots from the same mixture were melted in such a way that one was honeycombed and the other sound. The honeycombed steel ingot increased nearly 10 per cent of its length after teeming, while the sound ingot contracted down its central axis. It was assumed that about 9 per cent of the volume of the honeycombed ingot was occupied by blow-hole cavities. The ingots were forged to a smaller size after heating to a wash-welding temperature estimated at not less than about 1,100 degrees Cent., and were divided into two parts. One-half of each set of bars was reheated to 1,100 degrees Cent. for one hour and then rolled to bars 1 inch in diameter. The remaining bars were heated without soaking and were forged to 1 inch round bars. Test specimens of two different bars showed that the sulphur was distributed uniformly in the bar from the sound ingot, but was segregated in the places where there had been honeycombs in the unsound ingot.

A series of tests also was made to determine whether or not artificially-formed cavities with oxidized walls could be welded. It was assumed that if no carbon were present in the steel, oxidized blow-holes could not be perfectly welded. Holes were drilled almost entirely through the centers of the bars, which were then heated to redness and oxygen gas was blown into the holes so as to oxidize the walls of the cavities. The bars were then forged hot and when cooled were broken. The fractures indicated imperfect welding near to what was originally the open end of the bar, but below this, for two-thirds of the length, the welding appeared to be perfect. It was concluded, as a result of these experiments, that under the ordinary treatment to which honeycombed steel ingots are subjected by heating and rolling, internal, small cavities or blow-holes become perfectly welded, provided there is an absence of sulphide segregations and that even when these segregations are present, as they are not in continuous lines, but occur

only at intervals, the clean metallic faces between them come into contact and weld together. It also was concluded that surface blow-holes which become oxidized on their walls during the heating and rolling of the ingot, become more or less completely welded. The conditions favorable to this welding, however, must be a sufficiently high temperature and the maintenance of the steel at that temperature for a sufficiently long period after the cavities have been closed to afford the carbon in the adjacent steel an opportunity to reduce the oxide scale.

Newton Keyseat Milling Machine

A keyseat milling machine designed to operate cutters at their maximum efficiency by milling the length of



NEWTON KEYSEAT MILLING MACHINE

the key and feathering the end with one setting of the work, built by the Newton Machine Tool Works, Inc., Philadelphia, is shown in the accompanying illustration. When operating, the work to be keyseated is clamped in V-blocks and the carriage is adjusted toward the upright against stops, thereby locating the shaft under the cutter on the horizontal spindle. The spindle saddle is then adjusted by the top hand wheel, sinking the cutter into the work, and the distance is measured by the micrometer index on the machine. When the cutter is sunk to the proper depth the power feed to the table is applied for the traverse to cut to the required length. The horizontal spin-

dle is then adjusted vertically to clear the work, the table is adjusted against the outer stops, thereby centralizing the work under the vertical spindle and the ends are then rounded. To compensate for the various widths of cutters on the horizontal spindles, small spacing washers are provided. The clamps are arranged to swing so as to permit of lowering the work in the V-blocks when desired and the latter are equipped with auxiliary parallels to more conveniently handle work of various diameters. The V-block at the right of the table is mounted on a taper base to give the heights required for holding shafts parallel that have more than one diameter. The spindle saddle is counterweighted and the spindle revolves in capped bearings. It has three changes of speed, effected by means of a cone. There are three changes of belt feed to the table for each of the spindle speeds in addition to the hand adjustment.

The machine has a capacity of $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$ and $\frac{3}{4}$ inch in width up to 24 inches in length and 4 inches in diameter, in shafting and similar material. The work table or carriage is 44 inches long and 9 inches wide and has an automatic release to the feed to permit of milling duplicate length keyseats. To properly care for the lubricant, the arm holding the vertical spindle is arranged to serve as a reservoir. A machine of a larger size, but of the same design will handle keyseats up to $1\frac{1}{4}$ inches wide, 30 inches long and 8 inches in diameter. The smaller machine weighs about 3,000 pounds and the latter about 8,000 pounds. The machines are furnished either belt or variable speed motor-driven with belt or chain connection.

Annual Meeting of Chicago Foundrymen's Club

The annual meeting of the Chicago Foundrymen's Club will be held on May 25, and it has been proposed, although not definitely decided, that the members of this organization visit the Gary plant of the United States Steel Corporation, during the day, returning in the evening for the banquet, which has been one of the enjoyable features of the annual meeting of this club for many years.

A special meeting of stockholders of the Bethlehem Steel Corporation will be held in Newark, N. J., on May 14 and not May 15, as first announced. The meeting is for the purpose of pledging stock for a bond issue.

Automatic Control in Steel Plant Operation¹

*How This Problem Was Worked Out Successfully
in the Plant of the Youngstown Sheet and Tube Co.*

By Stewart C. Coey

The problem of motor control in industrial practice and especially in steel plant operation is one in which there is as great a diversity of opinion as in any other problem that presents itself to the industrial engineer. In this paper, it is the intention to take up some of the reasons for the use of automatic control for motors as opposed to manual control, and also some of the tests which have recently been made at the Youngstown Sheet & Tube Co. on the new developments in automatic control which have been brought about by the use of the series-wound accelerating switch, and the deductions and standards that have resulted from these tests, in connection with previous experience in automatic and manual control.

The development of automatic control has been carried on for some time for use on both alternating and direct current motors. In steel plant operation, this is confined for the most part to three-phase, 25-cycle, 220-volt induction motors and 220-volt direct current motors. In alternating-current control the practice has been to use wound rotor induction motors with accelerating switches in the secondary circuit, and reverse switches to reverse two phases of the primary circuit. Within the last year the greatest advance has been in the control of direct current motors, due, as has been said before, to the advent of the series wound contactor switch for accelerating work.

The Series Switch

The series switch is in its essential features a switch in which the moving part is so designed that after a certain definite amount of current has been reached in the series coil, the pull on the moving part is reversed due to the saturation of a portion of the magnetic circuit. This fixed locking-out point can be readily changed to suit conditions, and above this point the more the current is increased the greater is the locking-out tendency. After the switch has once closed, any increase in current will only hold it closed more firmly, and the current can drop to about one-

tenth of the normal full load current of the motor without the switch dropping out.

However, it is not the intention in this paper to take up the question of the design of the series wound contactor switch or any other type of switch. The fact is self-evident that the series contactor eliminates a lot of small auxiliary circuits and butterflies, which are necessary when the shunt-wound contactor is used for accelerating, due to the fact that the shunt contactor has to receive its operating current through a butterfly of some kind, which is opened and closed by means of a series coil. In other words, what the series contactor really does is to remove everything from the circuit excepting the series coil, which is necessary in some form when shunt-wound accelerating switches are used.

Elimination of Motor and Mill Break-downs

In considering the problem of the use of automatic or manual controllers in steel plant operation one of the most important considerations is found in the fact that a very large proportion of the operators who handle the various controllers are working on a tonnage or piece work basis. These operators are for the most part under the jurisdiction of the various department superintendents, with the possible exception of the crane operators, and in the Youngstown Sheet & Tube Co. even the crane operators come under the department superintendents. It is quite natural that the department superintendents should be more interested in the tonnage output of their departments than in the upkeep of electrical apparatus. The result of this condition is that the various motors are driven to the point of break-down. Now it is an established fact among operating men that no two men will handle a manual controller exactly alike, and the same man will handle it differently at different times, depending on conditions. This results in some men not giving the motors all they will stand safely and others driving them to the limit and beyond. There are very few men who will give the motor just the

right amount of accelerating current and even these men will exceed the safe limit without knowing it at times. It is a recognized fact that after a certain amount of output has been obtained from a motor a point is reached where the saturation of the iron, etc., produces a condition where the increased losses in the motor itself represent practically all of the increase in the in-put to the motor. The fact that, by the use of automatic controllers, the point of maximum acceleration can be obtained at each operation without running below at one time and above at another, has the effect of increasing the output of the plant by increasing the average time of doing the work and reducing the number of break-downs on the mill.

Another factor that causes trouble, when manually-operated controllers are used, is found in the fact that one man very often has from three to five or more motors which he has to control simultaneously. In our blooming mill we have for instance a man with the control of two approach tables and a screw-down to take care of. It is absolutely a physical impossibility to use manual controllers in a case like this and get speed out of the mill without plugging the motors. Exactly the same conditions exist on nearly every crane, and more especially on charging cranes. The result of this condition on cranes is that the crane man watches his hoist controller and pays little or no attention to his trolley and bridge control, while on the charging cranes the condition is even worse. It is quite a usual thing to see a bridge controller completely reversed before the bridge motor has lost its motion in the direction from which it is being reversed.

Advantages of Automatic Controllers

The effect of these various factors on overload protection is really very serious. Whether this protection is obtained by means of some type of circuit breaker or by fuse, the use of manual control results in a condition where the overload protection of the circuit is invariably set at a point greater than the safety of the motor controlled would warrant.

It has been the practice at the

¹Presented at the Pittsburgh meeting of the American Institute of Electrical Engineers, held April 25-27.

Youngstown Sheet & Tube Co. to use automatic controllers on reversing motors larger than 50 horsepower. This control has been accomplished by means of shunt-wound contactors, with four single-pole contactors for reversing duty, and from three to five of the same type contactors for acceleration.

Within the last year a number of different applications have been made of several makes of automatic controllers with series accelerating switches. These applications have all been successful to a marked degree and have been of great value in determining the type of control apparatus that is being installed in the new mills now under construction.

Interesting Application of Series Accelerating Switch

One of the most interesting applications of the series accelerating switch was on the blooming mill screw-down motor. This motor is a 100-horsepower 220-volt mill machine. The mill has been speeded up until this motor carries an average of about 150 horsepower, and in order to keep the armature from throwing the solder out of the commutator necks, a fan blows air through the motor continuously. On Dec. 2, 1911, a controller of the following description was put on this work as a place giving the hardest possible kind of a test. This controller consists of two double-pole shunt switches, for reverse work, five series switches, for acceleration, one lockout coil on the third series switch, one single-pole shunt switch as a line circuit breaker, mechanical and electrical interlocks between the reverse switches, and overload coil to open contactor type circuit breaker and reverse switches, and a two-point master controller.

The series switches on this board are now set to close at 800 amperes. The current is reversed in the motor on an average 20,000 times a day and on account of the speed necessary in operation, dynamic braking can not be used for stopping the motor with success, and the motor is plugged across the line through its full resistance, which is proportioned for the work. This board has given much better satisfaction than was even hoped for and after a few weeks' operation it was found that the lockout point was unnecessary and it has been taken off entirely since then. The copper tips on the two reverse switches last on an average about six weeks and the cost of replacing these is very slight. There has been very little trouble with the series switches and an entire absence of arcing on

them. This installation proves conclusively to our minds the value of the series contactor where speed points are not needed.

The places where speed points are needed require careful thought and study. It is easily seen that tables, transfers and some other motor applications need only one speed, but when we take crane trolleys and bridges it looks at first glance as though speed points were essential. However, by observing carefully it was found that the majority of crane-men seemed to be working only on the last points of their manual controllers and as an experiment a drum reversing switch with a controller consisting of three series switches was put on a 5-horsepower motor on the trolley motion of a 15-ton crane having a 104-foot span. In actual practice it was found that the crane-man could "inch" his trolley better with this type of controller than with the old manual type.

These were two of the most interesting points covered by the tests made in the matter of results obtained. Other experiments were made on threading machines with drum reverse and controllers and series accelerating switches. These were very satisfactory, as dynamic braking could be readily used in this case with a great increase in efficiency of operation. The series switch was also found to be of great value in ordinary starting work in place of ordinary hand starters for shears, wet-pans, fans, etc., and has been adopted as a standard in place of hand starters at the Youngstown Sheet & Tube Co.

Features of Motor Control

The main points embodied in the motor control for the new work now being installed at the Youngstown Sheet & Tube Co. are as follows:

All mill controllers are to be automatic. They will have two double-pole shunt switches for reverse duty, either three or four series switches for acceleration, one single-pole shunt switch for line circuit breaker with electrical and mechanical interlocks on the reverse switches, overload coils in both sides of the line arranged to open both the line circuit breaker and the reverse switch, and a reversing master controller.

For crane work, each crane switch-board is to be arranged with a knife switch, a double-pole shunt contactor of sufficient capacity for all the motors on the crane, one overload coil in each of the motor circuits and in the common return, arranged so that if any one trips it will open the

double-pole contactor, a safety lock and a reset switch.

The controllers for the trolley and bridge motors are all to be automatic and a duplicate of the mill controllers, with the omission of the overload protection and the single-pole shunt switch for circuit breaker protection.

The controllers for hoisting duty offer the least possible use for the series switch, as it is necessary to use shunt switches to get the speed points on hoisting and the divided power and dynamic braking circuit for lowering. In this type of controller the series switch is used in the same capacity as the series overload coil on the old type of controller.

For sizes less than 15 horsepower, the reversing drum has been adopted in place of reverse switches and it is quite possible that the ultimate development along this line will see the reversing drum used in place of the two double-pole shunt switches for considerably larger sizes of motors.

Summary of Results Obtained

A summation of the results that are obtained in steel plant operation by the use of the automatic controller follows:

1.—*Reduction in electrical repairs.* The use of automatic controllers cuts down the abuse of the motors and hence lessens the number of burnt-out armatures, broken shafts, etc. Of course one point must be borne in mind in this respect, and that is that unless the automatic controller is made as simple as possible and the ordinary motor inspector can understand it, there is liable to be a loss of time in the end due to the greater length of time that is taken in locating any trouble, which may more than take up the amount of time saved by the reduction in the number of breakdowns.

2.—*Reduction in mechanical delays.* The automatic controller saves all the the machinery that receives its power from the motor as well as the motor itself.

3.—*Increased capacity.* The automatic controller allows the motor to work at its maximum efficiency at all times and this in conjunction with the reduction in time lost in breakdowns increases the output of the plant.

Concerning the progress of construction of the Longitudinal Railway of Chile, the British Consul at Coquimbo states that in the course of the next few months the line will enter a district in which large and rich deposits of iron ore have been discovered convenient to the intended route of the railway.

Present State of Steam Turbine Development¹

*A Comprehensive Discussion of Turbine Construction,
Applications and Economies—Results of Geared Machines*

By A G Christie

Steam turbines are now being used for driving alternating current generators, turbo-compressors, turbo-blowers, pumps and marine propellers, and, by means of gearing, to furnish power to direct current generators, rolling mills and the propeller shafts of steamships. Reciprocating engines were formerly used for such purposes, but recently this class of engine has seldom been installed except for rolling-mill work, non-condensing service as on heating systems, rope and belt drives, hoists, and in certain combinations with low-pressure turbines in marine work. The high economy of the piston-pumping engines and also of some types of air compressors, has continued their popularity in spite of the increasing competition of steam turbine units. The steam turbine has found favor principally on account of its low first cost of installation, its small floor space requirements, its continued good steam economy over a period of years and its small operating and repair charges.

The increased use of steam turbines in sizes up to 1,000 horsepower seems to have received at least a temporary check in Europe by the introduction of the new Stumpf direct-flow engine.

Types of Steam Turbines

For the purpose of this paper, large commercial steam turbines will be divided into two classes: (a) fundamental types, and (b) modified or combined types.

The fundamental types of turbines are as follows:

(a) The Parsons type, which works on the so-called *reaction* principle. In this type the heat energy of the steam is changed into kinetic energy, both in the stationary guide blades and in the moving blades. In other words, both sets of blades act as orifices expanding the steam through a small pressure drop. As nozzles and orifices usually have very high efficiencies, this turbine should, theoretically, prove the most economical of all types. The Parsons turbine consists of a drum, or a number of drums, carrying the blade rows which alternate with rows in the casing. The

drums carry balance pistons to equalize the end thrust.

(b) The Curtis type, which works on the impulse principle with high steam velocities and few stages. Each stage, however, is provided with two or more rows of revolving blades known as *velocity rows*, with intermediate rows of guide blades. The steam velocity at the beginning of each stage is high. The revolving blades are carried on disks separated by diaphragms, which extend to the shaft and which carry the orifices between stages. Curtis turbines are now usually built with horizontal shafts. In American practice some sizes over

in certain constructional details. Fig. 1 shows a section of a Zoelly turbine.

Each of these fundamental types is based on sound theoretical principles. In the process of manufacture and in operation, certain features have not proved entirely satisfactory, hence far-reaching modifications have been made in the design of some types of turbines. Some manufacturers have combined the characteristics of two or more types to overcome the inherent limitations of each fundamental type.

The first rows of spindle blades in a standard Parsons turbine are placed on a drum of small diameter in order to make the blades as long as possi-

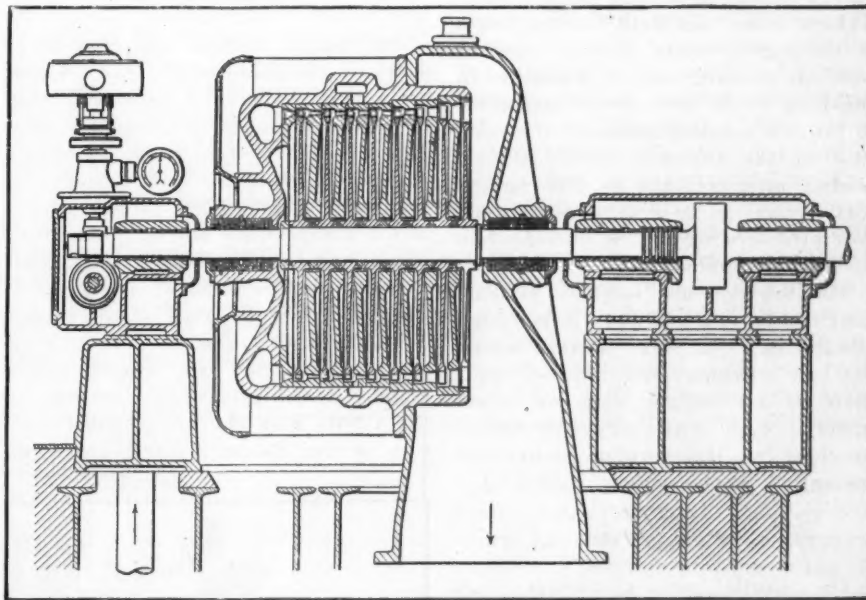


FIG. 1—SECTION OF ZOELLY TURBINE

7,000 kilowatts still have vertical shafts.

(c) The Rateau turbine, which consists of a number of simple impulse wheels in series on the same shaft and separated from one another by diaphragms carrying nozzles. It operates with lower steam velocities than the Curtis and consequently has many more stages. Each revolving element carries only one row of blades.

The type of turbine known as the Zoelly belongs to the same classification as the Rateau, from which it differs only in the use of higher steam velocities in the number of stages and

ble and to minimize the proportional leakage losses past the ends of the blades. A large number of rows are provided in order to keep the steam velocities low, as the blade velocities must be low with the small drum. The drop in pressure at each row is small and hence the leakage is correspondingly reduced. This construction results in a turbine with a long spindle and with great distance between bearings. High pressure steam, frequently at high temperature, is admitted to the casing. Distortion of casing and spindle are thus easily conceivable in such construction, and to

¹From a paper to be read at the spring meeting of the American Society of Mechanical Engineers.

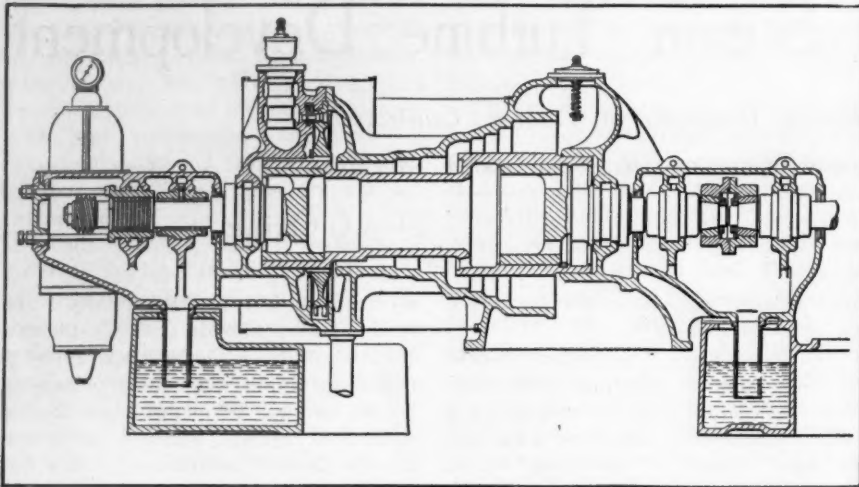


FIG. 2—SECTION OF BROWN BOVERI'S CURTIS-PARSONS TURBINE

allow for this contingency the clearance on the ends of all blades is usually increased. This distortion may be due either to unequal heating or to the growth of the cast iron casings. The fluid friction losses are large in this high-pressure section, for a large number of rows of blades must be revolved in steam of high density. The leakage losses and fluid friction losses in the high-pressure section, together with the troubles due to distortion in the long shaft, have forced designers to introduce modifications in this portion of the turbine, either by new blading arrangements, by dividing the total expansion in large sizes between two cylinders or by the introduction of impulse blading.

The low-pressure sections of Parsons turbines have always shown high efficiencies. As low steam velocities are characteristic of this type, there is no cutting away of blade material even with very wet steam, provided no injurious properties are present in the feedwater.

Curtis Turbine

The Curtis turbine utilizes high steam velocities in all stages. As steam becomes wet through expansion in the low-pressure stages, there is frequently considerable cutting of the blade material by the steam, although, contrary to first expectations, there is seldom cutting in the high-pressure blades due to the high initial velocities. The first row of velocity blades in a stage usually does the greater portion of the work, and hence the second row does not work at maximum efficiency. As the steam of the first stage is expanded very fully in the nozzles, there is no high pressure or superheat in the turbine casings or at the glands. The vertical type of unit is sometimes subject to electrical unbalancing and to other

troubles peculiar to this construction. It is not accessible in operation as the horizontal machines. Recent designs have provided for horizontal units and for the replacement of the low-pressure section by sections of other types.

Rateau Turbine

The Rateau turbine has high pressures on the gland at one end. There are a large number of disks revolving in dense steam at the high-pressure end. It has lower steam velocities throughout than the Curtis, and consequently has no blade-cutting effects in the low-pressure section. The clearances around the blades are large, but the shaft clearances of the diaphragms must be kept small. Some builders of this and the Curtis type have brought out new designs which employ the high-pressure section of the Curtis with the low-pressure section of the Rateau. These represent

a compromise between efficiency and manufacturing costs.

Under the classification of modified or combined types, there are turbines with modified Parsons, Curtis and Rateau construction, and turbines with combinations of Curtis-Parsons, Rateau-Parsons, Curtis-Rateau and Curtis-Zoelly construction, with a few special combinations.

Modified Parsons Turbine

The Allis-Chalmers Co. manufactures a turbine of the modified Parsons type. High peripheral speeds are employed with a decreased number of rows. A portion of the theoretical efficiency in the high-pressure end has been sacrificed by the use of fewer blade rows. Also a smaller proportion of work is done in this section than is usual in Parsons turbines. The blades are all provided with a channel-shaped shroud. European experimenters have pointed out that better efficiencies are obtained with shrouded than with plain blades, as the so-called spilling-over at the ends is prevented. Wing blades are fitted in the last low-pressure rows to take care of the large volumes of low-pressure steam. The spindle is much shorter and stiffer than the standard Parsons, and hence smaller clearances can be provided. The Fullager low-pressure balance piston is also used. The outstanding features of this design are, reaction principle with drum construction, few rows of blades with high steam velocities, short spindle construction, and employment of wing blades for high vacuum. The steam consumptions obtained on this type show improved efficiency over standard construction.

The Westinghouse Machine Com-

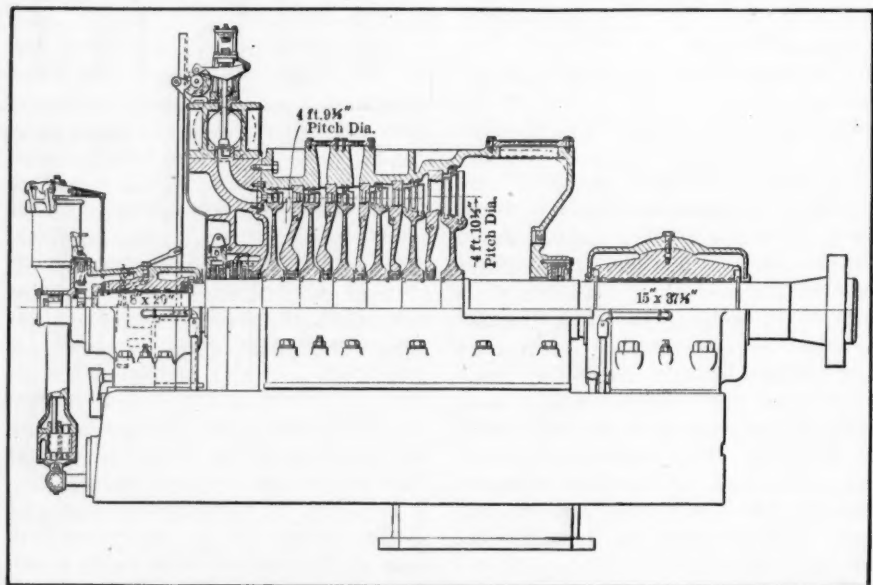


FIG. 3—SIX-STAGE HORIZONTAL CURTIS STEAM TURBINE

pany has developed a double-flow machine which employs a Curtis high-pressure stage with Parsons intermediate and double-flow low-pressure sections. There is only one balance piston in this machine next to the Curtis ring. These turbines run at high speeds, have short shafts and small clearances. The steam is expanded in the nozzles, and hence there are no high pressures or temperatures in the casing. By providing two low-pressure sections, high vacuum can be economically utilized.

European builders of Parsons turbines have replaced the high-pressure sections of their Parsons turbines by a Curtis wheel with two or more velocity rows, but have retained the single-flow Parsons drum construction for the remaining portions. One of these units is shown in Fig. 2. The temperatures and pressures in the casing are low, as the steam is expanded in the nozzles. The distance between bearings is decreased, the shaft is stiffer and clearances are smaller than in the standard Parsons turbine. The Fullager balance piston is used in the turbines of several of these builders. Turbines built in this manner have shown some exceptionally good efficiencies.

Compared with the Westinghouse machine, the leakage at the end of the low-pressure blading is less than in the double-flow section. On the other hand, the Westinghouse machine has smaller balance piston losses and can also utilize the highest vacuum at better efficiency.

The General Electric Co. now manufactures a horizontal type Curtis tur-

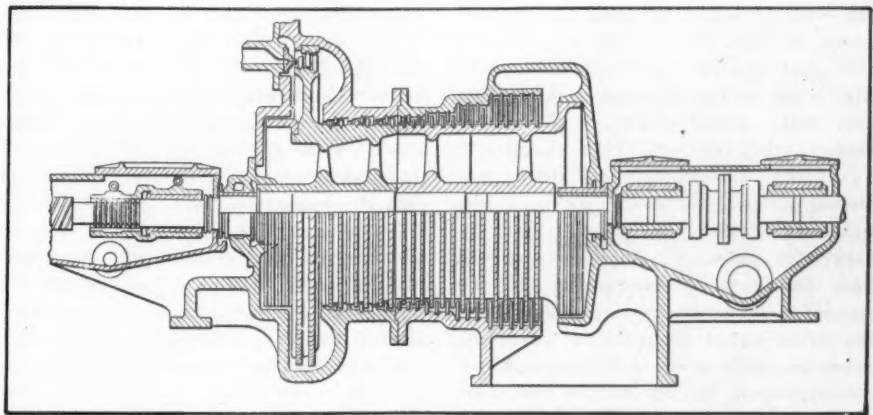


FIG. 4—SECTION OF BERGMANN CURTIS-RATEAU TURBINE

bine in all sizes up to 7,000 kilowatts, a section of which is shown in Fig. 3. This embodies all the essential features of the Curtis design. Compared with the vertical type, this design provides easier access to all working parts such as governor, bearings, valves, etc., and allows a better survey of the unit. The machine can also be dismantled and its internal parts examined with less trouble. The oiling problem is very simple compared with the vertical units, as there is no step bearing to provide for. It is possible that only horizontal units of all sizes will be built in the near future.

Many manufacturers in Europe are now building a turbine of the type shown in Fig. 4. This consists of a Curtis high-pressure with Rateau or Zoelly low-pressure sections, the number of stages depending on the size of the machine, the speed and the steam conditions. The pressure and temperature in the casing are low, as a consequence of the expan-

sion of the steam in the nozzles. The steam velocity is moderate in the low-pressure section. This machine is longer than the simple Curtis, but shorter than the Rateau. Its builders claim improved efficiencies over either of the fundamental types.

Belliss & Morcom, Birmingham, Eng., have introduced a turbine which consists of a high-pressure Curtis stage with a low-pressure drum construction like Parsons, but fitted with impulse blading on the spindle and blades forming expansion parallel wall nozzles in the casing. All other impulse turbines employ diaphragms extending to the shaft. There are a greater number of rows in a Belliss turbine than in a corresponding Rateau turbine, and hence a lesser pressure drop through each set of guide blades. The net leakage loss may thus be lower than a Rateau, even though the leakage area is greater. This turbine is essentially a Curtis-Parsons construction, with few rows of blades and with the expansion taking place in the stationary blades only.

A turbine, shown in Fig. 5, has recently been patented in England, which has some features of unusual interest. The high-pressure stage is Curtis, the intermediate section is of a drum impulse type with three stages, while the low-pressure portion is Parsons, which may be also double-flow. This combines features of all three fundamental types, and it will be interesting to see what results are obtained in practice by such an arrangement.

In the early days of steam turbine building it was difficult to secure suitable materials to withstand the stresses set up at high speeds of rotation. But as the demand for such materials increased, much study was given to the requirements for this service so that it has been possible through the use of more suitable material to increase very considerably

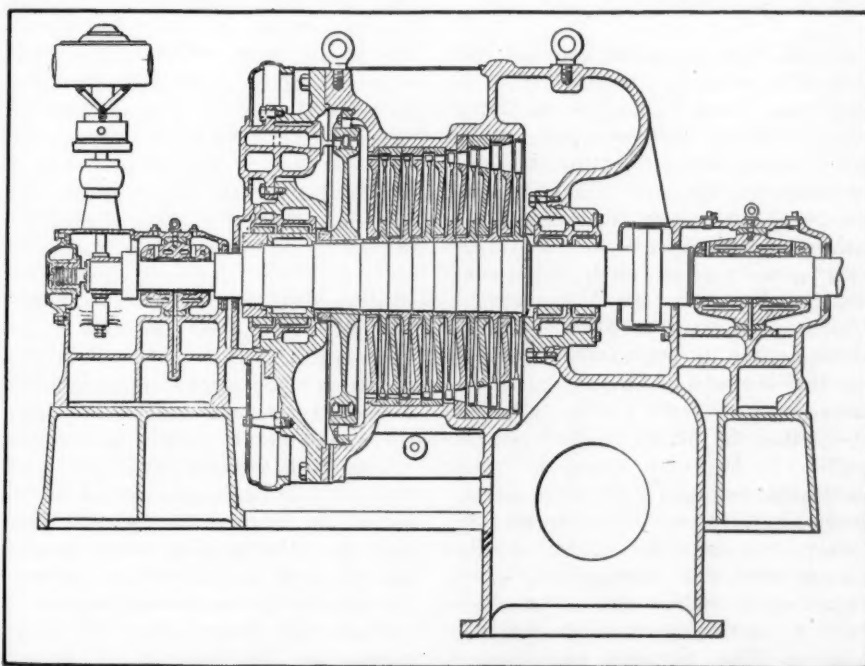


FIG. 5—SECTION OF CURTIS DRUM-IMPULSE PARSONS TURBINE

the speeds of all sizes of steam turbines.

Higher steam velocities are possible with increased peripheral speed, and thus fewer rows of blades or stages are required. This results in a shorter and more rigid shaft construction, which is, therefore, less liable to vibration. Many builders, especially those of Parsons turbines, have found this construction to give an increase in steam economy over the slow-speed types, so that the more compact modern high-speed machine is more desirable than the older type.

The requirements of a satisfactory blading material are that it shall withstand without deformation stresses due to centrifugal force, and temperature or pressure changes, it shall not cut out with high velocities of steam, and that it shall withstand the corrosive effects of moisture. Parsons turbines have used special

builders employ this well-known construction. As this form is usually all machine-made, it is considered by many engineers to be safer than where dependence is placed on hand work, such as must ordinarily be done where each distance piece is calked separately.

There are many methods in vogue for spacing and reinforcing the ends of Parsons blading. The Westinghouse Machine Co. uses a comma-shaped wire threaded through the blades near their outer end and bent over between them. Similar schemes are used by manufacturers in Europe. As a rule, however, European builders follow the old Parsons method of silver soldering or brazing the blades to a holding wire near their outer ends. They generally thin down the tips of the blades to reduce weight and to avoid injurious effects to spindle or casing from accidental rubs. Some builders, such as Sulzers, do

the blading and the spindle or casing.

The blading of impulse turbines is of nickel steel, frequently with 25 per cent nickel, in the high-pressure section and special bronze in the other stages. Experience with this 25 per cent nickel steel blading material has not been entirely satisfactory, and several manufacturers are now using a low carbon steel alloy with just sufficient nickel to prevent corrosion, usually about 5 per cent. These blades are said to be stronger and less liable to fatigue of material. Special bronze and Monel metal have also been successfully used. These impulse blades are stamped from sheets, drop-forged or milled from solid bars with or without a wide base to act as a distance piece, or are made from extruded metal strips of the desired cross-section. Usually these blades are of crescent section, but some are formed of flat material and made of constant thickness over the width of the blade. The separate distance pieces are usually of the same material as the blades themselves. In general, all impulse blades are provided with shrouds to prevent vibration and also to provide an enclosed passageway for the steam at high velocities. As there is no drop in pressure between the two sides of a row of moving blades, the clearance can be made large, both on the ends and sides, so that there is little possibility of rubbing when in operation.

Impulse blading is usually held in place in dovetailed grooves or in tee-shaped slots, although some manufacturers form their blades with two legs which straddle the disks and are held firmly in place by rivets. The first impulse turbines had blading in which the inlet and discharge angles were equal. Now almost all builders use blading on which the discharge side of the blade makes a sharper angle with the axis than the inlet side. This does not necessarily mean that the discharge area of the blades is smaller than the inlet area, for the blade is usually lengthened radially on the discharge side.

The number of rows of blades in any given type depends entirely on the size and speed of the unit, the steam conditions under which the turbine will operate and the heat drop per row or stage assumed in the design. In general, it may be said that the Parsons turbines require from 40 to 80 sets of moving and stationary blades, the Curtis from 4 to 8 stages, the Rateau from 12 to 25 stages, the Zoelly from 8 to 20 stages, while the Curtis-Parsons and the Curtis-Rateau combinations of

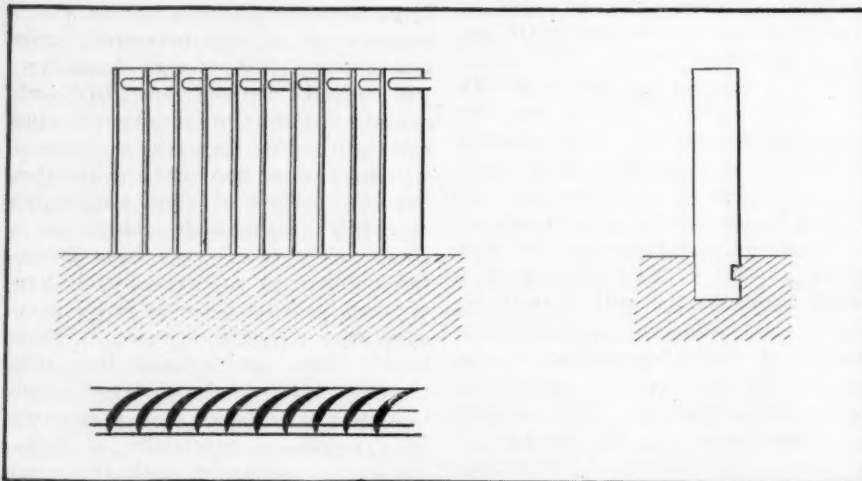


FIG. 6—BROWN BOVERI'S REACTION BLADING

bronzes and copper-nickel alloys. Steel blades have also been used in some cases. In these turbines the steam velocities are low and there is usually no cutting on this account. The principal problem with this blading is to manufacture it cheaply and secure it in such a manner that it will withstand all stresses to which it is subjected.

In Parsons turbines the blades are usually cut, punched or pressed into proper form from strips of drawn material. The original Parsons blading consisted of alternate blades and distance pieces placed in a slightly dovetailed slot and calked tight. Many European builders thread blades and distance pieces on holding wires before calking in. In this case the blading is made up in sections. Other builders of turbines of the Parsons type use Sankey's solid foundation ring held in place by a soft metal calking strip. Allis-Chal-

not thin off their blades or use shrouds, but make their spindles so rigid and well balanced that the blades can be made with a very heavy cross-section and hence need no support. Several manufacturers rivet the outer ends of their blades into channel-shaped shroud rings. This gives an especially stiff construction.

Advocates of the shrouded blading advocate that it provides a labyrinth for the steam and thus reduces the leakage losses from row to row. It also holds the blades at the required angles. It has been noted, however, that with wet steam there is a tendency for the moisture to pit the casing opposite the edges of the shrouds and thus increase the clearances. This action has also been noticed with unshrouded Parsons blading. The shrouded blading is usually so stiff that serious damage is done if rubbing starts between

course require several rows less than the fundamental types.

The high-pressure nozzles in impulse or combination turbines are made of bronze or nickel steel highly polished inside and placed either in the upper end of the casing itself, or, more preferably, in a separate steel casting which bolts upon the casing. In the latter construction the casing itself is never subjected to the high temperature or pressure of the entering steam.

The nozzles in the diaphragms between stages are usually made of nickel steel or other special steel, bent to the proper form and cast in place in the diaphragm body. Some manufacturers use brass nozzles in place of steel made up in sections and riveted or bolted in place. All these passages must be smooth and preferably very highly polished to reduce friction loss. After the first stage all nozzles have parallel walls on the discharge side.

Bearings and Lubrication

Practice varies widely with regard to the design and construction of journals and bearings. Builders of impulse turbines invariably use cast iron bearing shells provided with spherical self-aligning pads and lined with white metal. These are being used to an increasing extent on Parsons turbines and without exception on all low-speed units. Some manufacturers still retain the original Parsons form of bronze bearing shell with concentric rings on the outside, separated from each other by oil films. It has been claimed for this type of bearing that the oil films dampen any slight variation of the spindle and thus provide a quieter running machine. Experience has shown that this is not always the case and that such a bearing is often a real source of danger when the added clearance of the spindle due to play between the rings is taken into consideration. This construction is also much more expensive than the white metal bearings.

In Europe many turbines are run with a minimum amount of oil and with oil leaving the bearings at a temperature of 190 degrees Fahr. This practice is based on the argument that such a system of lubrication requires the least expenditure of power for oil circulation and in friction losses. However, practice seems to be tending towards flooded lubrication, in which a great quantity of oil at a temperature of about 100 degrees Fahr. is forced through the bearings by a pump of the rotary, centrifugal or gear type, driven from

the main shaft of the turbine. Flooded lubrication has enabled manufacturers to cut down the length of their bearings and thus reduce the total length of their turbines. The increased pressures per unit area on the bearings have not introduced any difficulties, so that pressures of 80 to 100 pounds per square inch at a surface speed of 60 feet per minute are common practice. The best results are usually obtained with a temperature of about 125 degrees Fahr. as the oil leaves the bearings.

Spindle Construction

Parsons turbines in America are usually built with a hollow quill into which the journal ends are forced and fastened by shrink links or bolts. The high-pressure blading is placed in grooves in one end of the quill itself. The intermediate and low-pressure blades are usually carried on

is that it takes too much power to drive the impeller, and that it provides a condensing surface for the steam. The amount of water required in a well-designed gland is very small, and there is no great circulation. Thus the water can have only a small effect as a condensing medium. Usually the steam directly inside the casing is under vacuum and then condensation would not be objectionable. It requires considerable steam to pack the labyrinth type of gland, and this loss often exceeds that due to the power required to drive the water impellers.

Impulse turbines use carbon rings at the high-pressure gland, especially when superheated steam is used. The leakage past the first rings is carried through a passage and pipe to the low-pressure glands to act as a vacuum seal. The labyrinth packing in the diaphragms is usually of bronze in the high-pressure stages

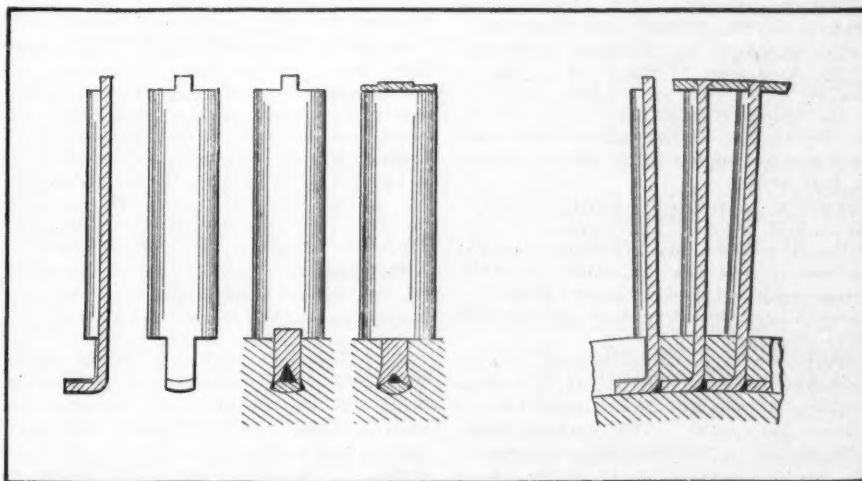


FIG. 7—BELLISS & MARCONI IMPULSE BLADING

cast or forged-steel rings which are afterwards forced and keyed upon the central quill. In Europe excellent hollow steel forgings can be obtained very readily, and hence the spindles of Parsons and other drum type turbines are usually made up of one forging with the journal shafts fastened into the ends. The shafts of impulse turbines are usually in one piece and carry the blade disks, which are high-grade steel or nickel-steel forgings or castings. These disks are fitted and keyed on the shaft and held in place by shrink links or lock nuts.

A small impeller supplied with water is provided on all American-built Parsons turbines to form an air seal at the shaft glands. European builders prefer to use labyrinth packings with live or throttled steam as an air seal. The objection raised by foreign builders to the water packing

and frequently of white metal in the low-pressure section. The low-pressure shaft glands are made either with carbon or labyrinth packing, sealed with steam.

(To be continued.)

Directory of Southern Industries

A directory and buyers' guide of southern industries, containing 447 pages, has been issued by the Tradesman Publishing Co., Chattanooga, Tenn. This is the third annual edition of this work and contains lists of foundries and machine shops, electric power plants, contractors and dealers in electrical supplies, engineers, machinery dealers, hardware and implement dealers, sheet metal works, etc. The directory is limited to the industries of 14 southern states.

New Catalogs

GRAB BUCKETS.—Grab buckets, which are specially designed to handle splint coal, are illustrated in a folder distributed by the C. W. Hunt Co., West New Brighton, N. Y.

FRICITION CLUTCHES.—Reproductions of a large number of letters from satisfied users of the line of friction clutches made by the Carlyle Johnson Machine Co., Manchester, Conn., are contained in a booklet recently issued by that concern.

COMMUTATING POLE MOTORS.—A bulletin, recently issued by the General Electric Co., Schenectady, N. Y., is devoted to that concern's latest development in the commutating pole motor. This bulletin supersedes a previous publication on the subject.

BORING MILLS.—A new leaf for filing with the loose-leaf catalog of the Gisholt Machine Co., Madison, Wis., has just been issued by that concern. It is devoted to the Gisholt type of 36-inch boring mill, which has a capacity for finishing flywheels in one chucking.

STEEL PRODUCTS.—A list of steel products manufactured by the Cambria Steel Co., Johnstown, Pa., is contained in a booklet distributed by that concern. This publication is intended to serve as an index, more detailed information concerning these products being set forth in the company's various catalogs.

ELECTRICITY IN MARINE SERVICE.—"The Application of Electricity to Marine Service" is the title of a bulletin published by the General Electric Co., Schenectady, N. Y. The booklet is printed in colors and contains much information of interest to motor boat owners.

FEEDER VOLTAGE REGULATORS.—The General Electric Co., Schenectady, N. Y., in a recently issued bulletin, describes the various processes to which its feeder voltage regulators are subjected during the course of their manufacture at the Pittsfield works of the company.

SPOT WELDERS.—The Winfield Electric Welding Machine Co., Warren, O., has issued a circular in which it illustrates its No. 312 electric spot welder. This machine weighs 1,700 pounds, is provided with foot treadle, and has an overhang of 12 inches. It is recommended for work requiring the use of both hands.

WATER POWER.—George J. Henry Jr., Rialto building, San Francisco, mechanical constructing engineer, has issued a booklet devoted to the development of water power for electric transmission purposes. The booklet contains descriptions of a number of types of apparatus for such service which are designed to meet special usages.

MOTOR TRUCKS.—In a catalog issued by the National Motor Truck Co., Bay City, Mich., its line of motor trucks is illustrated and described. These are manufactured for various purposes and may be provided with any kind of body. The catalog contains diagrams showing the construction of the chassis and other parts of the trucks.

DRILLS, REAMERS, ETC.—The extensive line of tools manufactured by the Celfor Tool Co., Buchanan, Mich., is listed in a new catalog just issued by that concern. It embraces twist drills, reamers, flue-cutters, countersinks, chucks, sockets, tool-holders, tool-bits, grinding machinery and boring mills, all of which are described and illustrated in the catalog.

ANNEALING AND HARDENING FURNACES.—The W. S. Rockwell Co., 50 Church street, New York, has issued a bulletin containing specimen views from its new catalog now in the course of preparation. The bul-

letin includes illustrations of furnaces for annealing, hardening, carbonizing, case hardening and otherwise treating various grades of steel.

AIR COMPRESSORS.—A booklet under the foregoing title has been issued by the American Compressor & Pump Co., Baltimore. In it is described a line of compressors designed to meet all possible varieties of service. The booklet also describes Peerless air lift pumping systems, high duty, dry, vacuum pumps, etc. It contains valuable data on air volumes, the areas of circles, etc.

IRON AND STEEL FINISHED MATERIALS.—The first of a series of circulars illustrating the progress made in the construction of its new warehouse has just been issued by the Brown-Wales Co., Boston. This concern maintains, for immediate delivery, an adequate supply of bars, angles, tees and other iron and steel finished materials; also a stock of pulleys, shafting, hangers and other supplies.

GRATES.—A complete line of rocking, dumping and stationary grates, manufactured by the Kelly Foundry & Machine Co., Goshen, Ind., is described in a catalog issued by that concern. It contains a large number of illustrations which show typical installations of the grates, while numerous cross-sectional views illustrate the methods of assembling and operating. The catalog also describes and illustrates the Kelly portable kiln grate.

HYDRO PRESSURE-DRAFT RECORDERS.—Hydro pressure-draft recorders, for recording pressure, draft and reversal of regenerative furnaces, such as by-product coke ovens, open-hearth furnaces, glass furnaces, soaking pits, etc., are concisely described in a pamphlet distributed by Herman Bacharach, 722 Lewis block, Pittsburgh. The principle on which this recorder operates is fully explained by means of diagrams and charts.

TRAMRAIL SYSTEMS.—The Brown Hoisting Machinery Co., Cleveland, has issued a booklet in which it briefly describes an improved overhead or tramrail system. The various types of Brownhoist electric hoists and trolleys are illustrated and attention is directed to the line of electric monorail man trolleys, which may be equipped with grab buckets, hooks, lifting magnets, etc. A large number of illustrations show these systems as installed to meet various requirements.

PNEUMATIC TOOLS.—The extensive line of pneumatic tools manufactured by the Independent Pneumatic Tool Co., Chicago, is illustrated in a 118-page catalog issued by that concern. This line includes reversible and non-reversible piston air drills; reaming, tapping and flue rolling machines; wood boring machines, grinders, close-quarter drills; riveting, chipping, calking and beading hammers; stay-bolt drivers; hoists, motors and other pneumatic apparatus.

STEAM TRAPS.—High and low pressure steam traps, manufactured by the Colonial Supply Co., Pittsburgh, are described in a circular issued by that concern. These traps are provided with shells from which all flat surfaces and squares are eliminated. The floats are tested hydraulically at 400 pounds and are guaranteed for 300 pounds working pressure. A by-pass which requires no extra piping, is placed above the valve so that the water seal can never be blown out.

AUTOMATIC STEAM TRAPS.—High pressure automatic steam traps of the McAuley type are illustrated and described in a catalog recently issued by the McAuley Automatic Trap Co., Pittsburgh. The advantages claimed for these traps are the outside location of the discharge valve; complete absence of stuffing boxes on any of the working parts; a large area in outlet of the dis-

charge valve and quick and positive opening and return of discharge to and from seat. The catalog includes a list of users of these traps.

"JACKHOL."—A filling liquid which has been put on the market by the Watson-Stillman Co., 50 Church street, New York, for use in hydraulic tools such as jacks, presses, punches, benders, etc., is described in a bulletin issued by that concern. This liquid, sold under the trade name of "Jackhol" is said to prevent corrosion and preserve the finish of cylinder surfaces, and to act as a preservative for the packings. It is claimed that this liquid will not freeze, thicken, gum or change its chemical composition.

NON-FERROUS CASTINGS AND INGOTS.—A handsomely illustrated booklet, showing the interior of a modern plant for the exclusive production of non-ferrous castings and ingots, has been issued by the Lumen Bearing Co., Buffalo. This concern is provided with facilities for furnishing ingots and castings in an extensive line of alloys which includes Lumen bronze, manganese bronze, phosphor bronze, yellow brass, red brass, aluminum, white metal, babbitt metals, solder, aluminum solder, trolley wheels, etc.

SEARCHLIGHT PROJECTORS FOR COMMERCIAL USE.—A bulletin under the foregoing title, recently issued by the General Electric Co., Schenectady, N. Y., is devoted to the adaptation of searchlight projectors to commercial purposes, such as in steam shovel workings, on fire-boats, etc. In addition to describing the General Electric Co.'s line of carbon arc projectors, the bulletin takes up a line of incandescent lamp searchlights recently placed on the market by that concern. The publication also contains information which should prove of value to yacht and motor boat owners.

ARC VALVE TAPPET ROCK DRILLS.—Rock drills, of the foregoing type, are illustrated and described in a bulletin recently issued by the Irgersoll-Rand Co., 11 Broadway, New York. These drills are provided with an arc-shaped valve, which is moved on a circular seat by a rocking tappet, the sliding surfaces all being concentric with the rocker pin. The working pressure is on the lack of the valve, so that wear, instead of inducing leakage, only improves the tightness of the working valve parts. The bulletin lists duplicate parts of the drill and contains descriptive tables of sizes and capacities.

SUSPENDED BINS.—In a recently issued booklet, the Brown Hoisting Machinery Co., Cleveland, describes Brownhoist patent suspended bins, designed for the storage of coal, ashes, cement, sand and other materials. These bins are constructed of concrete, with Ferroinclave as the reinforcement; they are recommended especially for service where the bin linings are subjected to corrosion or other deterioration. The booklet contains numerous illustrations of the bins as installed in power houses and other plants. Included is a description of Brownhoist machinery used in connection with these bins.

BETTER BUILDINGS.—A booklet under the foregoing title, containing information relative to the uses of formed metal roofing and siding materials, is being distributed by the American Sheet & Tin Plate Co., Pittsburgh. Owing to the great variety of purposes to which these materials may be adapted, the booklet is designed only to be suggestive of their possibilities. It contains illustrations of numerous types of buildings in the construction of which these materials may be used to advantage, and includes complete descriptions of the various brands of metal roofing, etc.

SCHWAB ON THE COAST

Makes Tour of Inspection—Discusses Ship Building

San Francisco, May 2.—Charles M Schwab, president of the Bethlehem Steel Corporation, which owns the Union Iron Works, arrived in San Francisco April 27, on a tour of inspection. He was joined by H. S. Snyder, vice president of the company, who arrived a few days ahead of him.

"We never sold steel cheaper and we never paid workmen more," said he. "Labor conditions are not satisfactory. The Union Iron Works, under Mr. McGregor's management, is in fine shape and should be enlarged. The opening of the Panama canal is going to do wonders for San Francisco. We will build a new dry dock just as soon as the two present docks cannot handle the business. I am going to spend four days going over the property here with Mr. McGregor to have him show me just how the plant can be enlarged. At present the plans for a new dry dock are suspended until some future time.

"I am informed by President McGregor that labor conditions here are better than heretofore. Heretofore, the supply has never been equal to the demand, but now I understand conditions are reversed.

"We are not antagonistic to organized labor," continued Mr. Schwab, "but we believe that it should be organized on a different basis than that now in vogue. No organization can achieve ultimate success that is not based on sound principles, and any organization that makes it impossible for the best workmen to get the highest wages is on a shaky foundation. For all that, the condition of labor in the steel trade was never better than now. Last year the profits of the United States Steel Corporation were the smallest in its history, but its payrolls show that it paid the highest wages of its career."

Mr. Schwab discussed the effect of the Sherman law on the steel trade in almost the same words used in his recent speeches in Cleveland and Cincinnati.

"I should," he said, "be in favor of some sort of regulation similar to that exercised by the Interstate Commerce Commission over the railroads."

He had this to say regarding the ship building conditions: "The trouble is not that it costs too much to build an American ship, but that it

costs too much to operate one under the present laws. The opening of the Panama canal is not going to make much difference in that regard. Take our plant right here. We cannot make it a ship building plant in the real sense as long as there is no possibility of an American merchant marine. We build ships in a small way and the repair business is a growing feature and will increase greatly with the opening of the canal, but at present it costs so much to operate American bottoms under the laws that there is a very small percentage of the ships of the world built in the United States."

Mr. Schwab, Vice President Snyder, Henry T. Scott, formerly one of the owners of the Union Iron Works, General Manager J. J. Tyman and several prominent business men of San Francisco were the guests of President McGregor at a luncheon at the Union League Club of San Francisco, on April 29.

CAR SHORTAGE

Causing Trouble for Shippers of Sand—Buy Early.

Shippers of molding sand throughout the east and central west are experiencing great difficulty in obtaining cars and the supply since last November, when the car shortage at the sand pits was acute, has not increased. The car shortage during the spring months is unusual and it is the first time in many years that miners of sand have been unable to obtain a sufficient number of cars to ship their product during the spring season. The Pennsylvania railroad has placed an embargo on all cars of less than 50,000 pounds capacity and will not accept them for transportation over its lines.

If the usual car shortage which exists during the months of September and October is to be measured by the present car supply, it is evident that little equipment will be available at that time for the various sand pits throughout the country owing to the fact that the grain movement is of prime importance and all available cars are sent to the west and northwest when this movement sets in. For this reason sand shippers are unanimously of the opinion that foundrymen should place orders for the early delivery of their winter sand supply which can be delivered to advantage during the summer months.

Ground is expected to be broken by June 1 for the plant of the Brier Hill Steel Co., in Youngstown, O.

FORCES INCREASED

By Oliver Iron Mining Co.—Heavy Ore Movement Indicated.

The resumption of mining activities in the Lake Superior district, following the opening of navigation, has strengthened the conviction that the ore movement this year will surpass that for 1911. Several properties which have not been worked for several years will resume shipping this season and there will be a number of new shippers.

The Oliver Iron Mining Co. has largely increased its force and six steam shovels have been placed at work in the mines around Hibbing, Minn., including the Hull-Rust, Uno North and Uno South, and the Dale. The Morris, a "million-ton pit" for several years, until last season, is expected to ship heavily this year.

The Great Northern railway has contracted to move 12,000,000 tons of ore this season, the largest amount the road has moved since it began shipping ore. The increase is explained by the heavier shipments from the Hill properties, which the United States Steel Corporation will make this year. The increase is necessary to place the shipments within the minimum required before the cancellation of the Hill lease, Jan. 1, 1915.

The Cuyuna range is shipping this season, and it is stated that the Soo line will move about 500,000 tons of ore this season from this range, more than three times the amount shipped last year.

Work has begun on sinking the shaft of the Lucky Star property, near Negaunee, Mich., owned by the Cleveland-Cliffs Iron Co., and the Breitung interests. A drill has been operated on the property for the past four months to locate a shaft. The first level of the mine will be at a depth of 1,100 feet, with a cross-cut of 500 feet to the ore formation.

The Jones & Laughlin Steel Co. has awarded a contract for a new power plant to be erected at the company's Forbes mine, at Iron River, near Ishpeming, Mich.

The first vessel to take a cargo at the Great Northern docks at Superior, Wis., was the steamer E. H. Gary, of the Pittsburgh Steamship Co.'s fleet.

The Oliver Iron Mining Co. has closed its Champion mine, a Marquette range property. The mine, which was formerly a heavy shipper, has not been worked extensively for some time and did not enter the list of shippers last season.

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Railroad Buying Heavy

Car orders placed since Jan. 1 make a total easily in excess of 60,000 cars, and approximately half these orders have been placed in the past two or three weeks. Orders placed in the first three months of the year fell slightly short of 30,000.

The appearance of some large car orders in the past ten days, the Harriman, St. Louis & San Francisco and Atchison orders alone making a total of over 20,000 cars, suggests that attention be paid to the fact that many other and smaller orders have been placed this year, though until within the past fortnight the buying bore no semblance to the spectacular movement late last year. That movement, it will be recalled, left the car shops with a very large amount of business on books Jan. 1, easily exceeding 75,000 cars. Indeed, there were more cars booked in a period of a few weeks, late in the year, than the shops made during the entire calendar year 1911.

The car shops entered the present year with a comfortable volume of business on books, but at the moment it was quite uncertain whether many additional orders would be forthcoming in the near future. The orders had been taken at very low prices, and the shops had had some unpleasant experiences in gathering together large working forces, at considerable expense, only to find orders play out after a short period of heavy operation. Accordingly, they concluded to nurse the business and produce the cars at the lowest possible cost. This was an absolute necessity, indeed, for the orders had been booked at the lowest prices on record. Plans were laid for operating at a moderate gait and making the business last. While there is a total capacity in the country to make a thousand cars, or a trifle more, per day, the actual average output during the first four months of this year has probably not exceeded 500 cars a day, which would mean an output during the first

four months of not far from 50,000 cars. Thus the car shops find themselves with more business on books at this date than they had Jan. 1, when they had feared that they would have less.

The severe car shortage of February and March drew renewed attention to the need of the railroads for additional equipment. Of course, the weather was exceptional, but at no time in recent months has there been any material surplus of cars. Shippers do not expect railroads to be chronically lacking in facilities, although perhaps at one time they were afraid to have any thoughts whatever on the subject. The volume of freight traffic in the past few months has not been exceptional by any means; on the contrary, it is reasonable to assume that in the future the volume will be larger, and the need of additional rolling stock is, therefore, pressing.

The heavy car buying of the past fortnight probably represents simply the commencement of a period of heavy buying, and if continued for a few weeks longer, will require the car shops to increase their working forces and turn out cars faster, at the same time insuring them a prolongation of the activity for a much longer period than was assured at the opening of this year.

In another direction also, the railroads have been increasing their purchases. Late last year and early this year, a number of railroads placed rail orders which at the time were regarded as final for the season of 1912. Now they are coming into the market with additional requirements and placing second orders. The rail mills will probably reach a higher rate of operation this summer than they have experienced for a long time past, and taking rail, car and other railroad buying together, it is evident that the railroads will take a larger percentage of the total output of the iron and steel industry than they have done at any time since the palmy days of 1906-7.

Last Year's Electric Steel Production

The production of electric steel in 1911 was a disappointment, considering the great promise made by the gain of 1910 over 1909. Production of electric steel in 1911, as reported in gross tons by the American Iron and Steel Association recently, compares with the two preceding years as follows: 1909, 13,762; 1910, 52,141; 1911, 29,105. Of course, when production is so small, the variations from year to year may be due largely to fortuitous circumstances. As a tonnage proposition, electric steel is interesting chiefly in connection with rails, and the ideas of engineers as to experiments may change radically from one year to another. At the same time, one cannot blink the bare facts that from 1909 to 1910 the production increased 280 per cent, almost quadrupling, while from 1910 to 1911 it decreased 44 per cent, being almost cut in half. The gain from 1909 to 1911 was practically a doubling, which, for only two years, would have been considered eminently satisfactory, if 1910 had not stepped in and shown what could be done.

The theorists who have been giving the public so much by way of details of costs and methods of operation owe it to themselves, when they have given the suggestion that electric steel making is an exact science, to come forth and give a practical explanation in a broad way of how these production statistics

have come to be as they are. Discussion of details should yield to some matter-of-fact treatment at this juncture.

A Proposed Open Price Policy

In the current issue of *The World's Work*, Arthur J. Eddy publishes the first of a series of articles that he proposes to write on "The New Competition—The Open Price Policy", giving what he believes to be a practical and legal way for the formation of associations of men engaged in the same industry so that they can publicly file all inquiries, bids and contracts, and thereby establish much more satisfactory relations than exist at the present time.

Mr. Eddy, in beginning his paper, says there was a time when the secret price policy prevailed in the retail trade in this and all other countries, when every merchant sold his wares at as many prices as he had customers. That practice has fallen into disrepute in England and America, and generally speaking the secret price policy is a thing of the past in the retail trade of this country. But Mr. Eddy says that in the manufacturing and contracting world the old discredited policy prevails. From the president down to the least important salesman, everybody is clothed with discretion, everybody can make or shade a price. Mr. Eddy declares that the *secret* price is the mark of the old—*false* competition. The *fixed* price is the mark of illegal combination—*suppressed* competition. The *open* price is the mark of the new—*true* competition. Mr. Eddy inquires what is meant by the "open price", and defines it in the following paragraph:

"Exactly what the word signifies, a price that is open and above board, that is known to both competitors and customers, that is marked in plain figures on every article produced, that is accurately printed in every price list issued—a price about which there is no secrecy, no evasions, no preferences. In contract work, it means that every bid made and every modification thereof shall be known to every competitor for the order; it means that even the cunning and unscrupulous competitor may have this information to use or abuse as he pleases. In short, the open price policy means a complete reversal of methods now in vogue."

Mr. Eddy would have associations with a central office in charge of a secretary, with whom the members would file all inquiries, bids and contracts. Information contained in reports of inquiries would not be interchanged. From the reports of inquiries, the secretary would make up a weekly bulletin containing statistical information indicating the amount of business pending. Information contained in bids would be interchanged. No bidder would be bound to adhere to his bid for the fraction of a second. After ascertaining the bids of others, each would be free to lower his own bid. Mr. Eddy believes that a free and frank interchange of bids, with perfect liberty to cut and slash as members might please, would not result in fiercer competition. On the contrary, he says that while it does not lessen true competition, it takes out the bitterness and ugly elements that go to make up the old cut-throat competition. The filing of contracts is the final step in the reporting plan. Mr. Eddy believes that under this open price policy vicious bidding, that is, bids put in by com-

petitors who know they have no chance to get the work, would disappear. With open bidding, the automatic tendency would be for prices to approach normal levels and variations so frequent under false competition would be minimized, and by eliminating secret prices, rebates, concessions and graft would disappear. Competitors, instead of working under conditions of jealous distrust and suspicion, would co-operate to accomplish as a unit the things they rightfully may do.

"Finally," says Mr. Eddy, "the open price policy—the new competition—with the friendly associations it involves, will tend to make commercial life a little pleasanter, a little better worth living."

This last sentence sound very much like some of the expressions that were heard in connection with the now famous Gary dinners, and although men differ widely as to the wisdom of the price maintenance policy, all who are familiar with that movement agree that the better acquaintance resulting from the dinners and meetings brought about better feeling and softened the asperities of business. Mr. Eddy's plan seems like a radical one and yet it is only going a step farther than those who attended the Gary dinners went. Mr. Eddy clearly sees the practical difficulties of working out his plan, but it is evident that he has given it much thought and it is worthy of careful consideration by business men and officials of the government. His future articles will be awaited with interest.

Development of American Hobbing Machines

When the hobbing process of generating gears was first introduced into this country from Europe, a great controversy arose regarding the accuracy of the work produced by this method. Practically no one questioned the rapidity of the gear hobbing process and there is little doubt that on roughing-out gears where finish is immaterial, no method has been devised which can compare with it. In recent years, American manufacturers have made great strides in the design of hobbing machines and it is now generally admitted that defects in hobbled gears are largely due to inaccurate hobs rather than to any fault in the principles of the system. Also it has been almost impossible to duplicate a given hob. In addition, much of the complaint regarding inaccurate results and poor finish can be traced back to the use of machines that were not rigid enough for the work. The American builders early realized this and with the experience which they had obtained in the design of heavy tools for high-speed steel, quickly remedied any structural defects that may have existed in the original European tools. At present, therefore, the American hobbing machines are exceptionally well designed and stiff enough to obviate any difficulties due to chattering or similar causes.

The recent development of methods for the manufacture of accurate hobs on a commercial basis seems to have removed practically the last objection which could be made against this method of gear cutting. At the present time, American manufacturers are producing hobs which are extremely accurate and of such design that they may be readily sharpened without changing the tooth form. In hobbing, the form of the tooth is actually generated and in theory this method is superior to almost any other.

Array of Able Attorneys in a Great Case

Men Who Will Appear for the Government and the United States Steel Corporation in the Dissolution Suit

The hearing of the dissolution suit of the government against the United States Steel Corporation will bring together a distinguished array of the best legal talent in the country. Both the government and the Corporation have fortified themselves with the best legal advice they could command. Some of the attorneys are taking part in the proceedings before Special Examiner Brown, now in progress in New York City. Others may not appear until the case reaches the United States court. Following are brief sketches of the lawyers who will oppose each other at the hearing:

The Corporation Attorneys

Francis Lynde Stetson, general solicitor for the United States Steel Corporation, has occupied this advisory position since the formation of the Corporation in 1901. Mr. Stetson is an eminent corporation attorney and one of the most prominent members of the New York bar.

He was born in Keeseville, Clinton county, New York, on April 23, 1846. He attended Plattsburgh Academy and received his collegiate degree at Williams college, in 1867. His law training was received at Columbia University and, at St. John's college. He began the practice of law in New York in 1869, and is now senior member of the firm of Stetson, Jennings & Russel. He is a member of various New York clubs and societies.

In 1908, Mr. Stetson served as president of the New York State Bar Association and was president of the Bar Association of New York in 1910 and 1911. In addition to his connection with the United States Steel Corporation, he is general counsel for the United States Rubber Co., the Northern Pacific railroad, the Erie railroad and the Southern railway.

Joseph H. Choate, who appears for the United States Steel Corporation in the dissolution suit, has an international reputation as a lawyer and diplomat. He has appeared in some of the most famous legal battles ever waged, and a testimonial of the great esteem in which he was held was shown by his election as an honorary bencher of the Inner Temple, London, England, in 1905, following his six-year tenure of office as ambassador of the United States to the court of St. James.

Although an octogenarian, Mr. Choate's

reputation as a lawyer, orator and after-dinner speaker is still as lustrous as in his younger days. He was born of a distinguished New England family at Salem, Mass., on Jan. 24, 1832, and entered Harvard University at the age of 16. He received the degree of A. B. in 1852, was graduated from the law college of that university two years later and was admitted to the bar of Massachusetts in 1855. The following year he removed to New York and has since continued his activities in that city.

Among the notable legal battles in which he has appeared was that as counsel for General Fitz-John Porter in his protracted and successful fight for reinstatement to military rank. He was counsel in the Cesnola case and was one of the committee of 70, which broke up the notorious Tweed ring in New York.

Mr. Choate was ambassador to England, from 1899 to 1905. He served as president of the New York constitutional committee of 1894 and is a member and ex-president of the American Bar Association. He still occupies the offices of a trustee and patron of art societies and public institutions and is famed as an after-dinner speaker and orator. He has been active in politics as a Republican and has always championed the cause of an unbossed judiciary.

Raynal C. Bolling, as assistant general solicitor of the United States Steel Corporation, has devoted considerable study and attention to the welfare work of the Corporation in behalf of its employes. He has been active in the administration of the pension and accident relief systems of the Corporation, tending toward a betterment of the condition of the workmen. He is a native of the south, having been born in Hot Springs, Ark., on Sept. 21, 1877. He was educated at the William Penn Charter School, Philadelphia, and at Harvard University. He received the degree of A. B. at the latter institution in 1900, and graduated from the law school at that university in 1902.

Mr. Bolling has been an attorney for the Corporation for nine years and for several years past has been the assistant of General Solicitor Stetson. He is a member of the American Iron and Steel Institute and of several New York clubs. He resides in New York.

John G. Johnson, associate counsel for

the Steel Corporation, is one of the leading corporation lawyers of Philadelphia. He interests himself in only the largest cases. His work is largely for corporations and he is generally successful, a notable exception being the loss of the Northern Securities case.

Two presidents, it is understood, have offered him a seat on the United States supreme court bench, but he has steadfastly declined any offer that would take him away from active practice. He was born at Chestnut Hill, Philadelphia, and has always resided in that city.

Mr. Johnson is conservative in action and tastes, avoids publicity and rarely consents to be interviewed on any subject. He is a patron of art, and has a very fine collection of paintings and pictures. He was the government delegate at the Universal Congress of Jurists, held at St. Louis in 1904.

Stories indicative of the character of the distinguished subject of this sketch are numerous, one instance being related of his refusing to accept a check for \$25,000 from a corporation, whose case he had won in a 15-minute plea. The representative of the corporation began writing a check for a larger amount, when Mr. Johnson stopped him and told him to write the check for \$5,000, considering that sum sufficient for his services.

Richard V. Lindabury ranks high in New Jersey in his profession as a corporation attorney, and has been counsel in many of the important corporation cases tried in that state in the past ten years. During the early months of the hearings before the Stanley congressional committee, Mr. Lindabury was actively engaged in behalf of the United States Steel Corporation.

He was born at Peapack, Summerset county, New Jersey, on Oct. 13, 1850, and was educated in the public schools. He took a classical course with the Rev. Henry P. Thompson. He was admitted to the bar in February, 1874, and since that time has engaged in active practice at Newark, N. J. His home is at Bernardsville, N. J.

David A. Reed, one of the junior counsel for the United States Steel Corporation in the present litigation, is the son of Judge James H. Reed, a distinguished jurist prior to his retirement from the United States bench, and now chairman of the board of the Carnegie Steel Co., and a director of the United States Steel Corporation. During the



RICHARD V. LINDABURY,
Attorney for Corporation.

JOSEPH H. CHOATE,
Attorney for Corporation.

DAVID A. REED,
Attorney for Corporation.

GEORGE W. PEPPER,
Attorney for Government.

FRANCIS LYNDE STETSON,
Attorney for Corporation.

JACOB M. DICKINSON,
Attorney for Government.

JOHN G. JOHNSON,
Attorney for Corporation.

GEORGE W. WICKERSHAM,
Attorney for Government.

RAYNAL C. BOLLING,
Attorney for Corporation.

closing months of the session of the Stanley congressional committee, David A. Reed was actively at work at the hearings in the interests of the Corporation.

He was born Dec. 18, 1880, in Pittsburgh, attended Shadyside Academy in that city and graduated from Princeton University in 1900. He studied law at the Pittsburgh Law School, being admitted to the bar in 1903. He has been engaged in general practice since that time, and is a member of the firm of Reed, Smith, Shaw & Beale.

Attracted by his work at Harrisburg during the last session of the legislature in behalf of an equitable employers' liability bill, Gov. Tener, of Pennsylvania, has appointed Mr. Reed chairman of the new Industrial Accidents Commission of that state. The commission will endeavor to draft a just and suitable employers' liability act. Mr. Reed has been active in a number of important corporation cases.

The Government Attorneys

The government will be represented in the dissolution suit by Attorney General George W. Wickersham, Special Counsel Jacob M. Dickinson and Special Assistant Attorney General George W. Pepper.

George Woodward Wickersham, attorney general of the United States, was born at Pittsburgh, Sept. 19, 1858. The Wickersham family has been prominent in Pennsylvania affairs for several hundred years, the grandfather of George W. Wickersham having been first president of the Philadelphia Board of Trade. His father departed from the business career that the family had invariably sought and served through the civil war.

He attended the Western University of Pennsylvania, Nazareth, Pa., and Lehigh University, where he studied civil engineering. He received the degree of LL.B. from the law department of the University of Pennsylvania in 1880, and immediately began active practice. He removed to New York in 1882, entering the office of Chamberlain, Carter & Hornblower, and the next year became managing clerk of the firm of Strong & Cadwalader. He was admitted to membership in the firm in 1887 and continued this connection until his appointment as attorney general in 1909.

He acted as counsel, manager and constructionist rather than advocate, his special clients being industrial, fiscal and transportation interests. He was counsel for the New York State Savings Bank Association; counsel for and a member of the committee which reorganized the Chicago Union traction lines; for the construction companies which built the New York subways; the contractors who

dug the Pennsylvania railroad tunnel under the East river; the Interborough Rapid Transit Co., and for the managers of the merger, under government guardianship, of the several Mexican railway systems.

His most signal achievements were the winning, after five years' litigation, of the suit involving the ownership of the stocks and bonds of the Sioux City & Northern, and Sioux City, O'Neill & Western Railroad companies, and also the ten years' suit to establish the right of the holders of bonds of the Terre Haute & Peoria Railroad Co., to the revenues thereof as against the Terre Haute & Indianapolis railroad. Both cases established important precedents in railway management and litigation.

In 1901, the University of Pennsylvania conferred the honorary degree of M. A. upon him, and in 1909 he received the honorary degree of LL.D. from Lehigh University. He is a student and an accomplished linguist.

Jacob McGavock Dickinson, special counsel for the government, has been at work on the dissolution suit since his resignation as secretary of war, May 21, 1911. It is probable that the brunt of the work for the prosecution will be borne by him.

He is a southerner, having been born in Columbus, Miss., on Jan. 30, 1851. He graduated from the University of Nashville and studied law at Columbia University, New York. He later studied in Paris and at the University of Leipzig. He was given the degree of LL.D. by Columbia University and the University of Illinois.

From 1895 to 1897, Mr. Dickinson was assistant attorney general of the United States, and in 1903 was counsel for this country before the Alaskan Boundary Tribunal in London. He was appointed secretary of war and took office March 12, 1909.

George Wharton Pepper, an attorney, who ranks high at the bar of Philadelphia, will serve as special assistant attorney general of the United States in the government's suit against the Steel Corporation. He was appointed as associate to Jacob M. Dickinson, government's special counsel, in February.

Although only 42 years of age, Mr. Pepper is understood to have been considered for the vacancy on the Supreme court bench, following the death of Associate Justice Harlan, which post was later accepted by Mahlon Pitney, chancellor of the state of New Jersey.

Mr. Pepper attended the University of Pennsylvania, where he graduated from the law school and later succeeded to the Algernon Sidney Biddle chair in this department of the university. He has written several treatises on law, including the "Borderland of Federal

and State Decisions", "Pleading at Common Law and Under the Codes", and in conjunction with William Draper Lewis, dean of the law school, published the Pepper and Lewis Digest. He served as receiver for the Bay State Gas Co., of Delaware. He is high in the councils of the Protestant Episcopal church.

Henry E. Colton and Barton Corneau, special assistants to the attorney general, will assist in the presentation of the government's case. They have done a large part of the preliminary work of preparation.

RATIONAL PRACTICE

Discussed by Dr. Moldenke at Newark Foundrymen's Association.

"Rational Cupola Practice" formed the subject which Dr. Richard Moldenke, secretary of the American Foundrymen's Association, discussed before the Newark Foundrymen's Association at the Washington restaurant, Newark, N. J., Wednesday evening, May 1. Dr. Moldenke spoke of the present tendency in many plants towards increasing the cupola size and he thought that this had gone to extremes in some cases, as he had seen installations of 120-inch diameter. He believed that the unit best conducive to good results was the 54-inch cupola. In good melting practice, the iron usually came down in from 8½ to 10 minutes. He expressed the belief that even quantities of coke and metal arranged in alternate layers from the bottom of the cupola up produced the best results in melting.

At the business session which followed the address of the evening the following officers of the association were elected for the ensuing year: President, Gerald Hannay, Oscar Barnett Foundry Co.; vice president, James Flockhart, Maher & Flockhart; secretary, Arthur E. Barlow, Barlow Foundry Co.; treasurer, John Campbell, Maher & Flockhart; executive committee:—James F. Flockhart, Maher & Flockhart; Louis Sacks, Louis Sacks Iron Foundry; R. J. M. Welch, Samuel L. Moore & Sons Corporation, Elizabeth, N. J.; Thomas Malcolm, Riverside Steel Casting Co.; James Morrison, Morrison Foundry Co.

The Wolverine Brass Works, Grand Rapids, Mich., advises that it is erecting a new concrete building, to contain about 80,000 square feet of floor space. It is not in the market for any machinery as its required power plant machinery has been purchased.

IRON AND STEEL SECURITIES

An unsettled downward movement developed on the New York stock exchange last week, resulting in a decline in all the important issues. On one or two days, security prices advanced, but the drift was generally downward.

Monday, the market was reactionary and averaged slightly lower; wheat and corn advanced to new high prices, later reacting sharply. Tuesday, the market showed an erratic tendency; the general market closed heavy; a number of influences contributed to the reactionary tendency; the quarterly report of the United States Steel Corporation was unfavorable. Wednesday, the general list yielded fractionally; cotton market broke violently and grain closed lower. Thursday, less activity was displayed, but prices were firm; Steel common recovered all the loss occasioned by the quarterly report. Friday, the report on the condition of winter wheat started a selling movement, with the bears active. Saturday, the grain market was excited and higher; stocks ruled lower in the early dealings, but recovered and closed steady.

Money on call ranged between 3 and 2 1/4 per cent. Time money was fairly active during the week. The actual condition of clearing house institutions showed loans increased \$12,352,000; net deposits increased \$4,778,000; total reserve \$435,860,000, and the excess of reserve \$14,276,750, a decrease of \$5,400,300. Non-member banks and trust companies showed loans increased \$5,575,300; net deposits increased \$5,724,100; reserve on deposits increased \$2,148,600, and the percentage of reserve 19.3, against 19.2 the week previous. Bank clearings for the month of April were 21.3 per cent in excess of last year. Fortnightly railroad statistics showed an idle car surplus of 138,881, an increase of 59,492 over the preceding fortnight. Commercial failures numbered 315, compared with 310 the preceding week and 244 the corresponding week last year. Shares were sold to the number of 3,838,200, compared with 3,586,200 the preceding week and 270,600 the corresponding week a

	Clos'g 'Quo. May 4	Changes in week.	Annual Meeting date 1912	Stock		Dividend	
				Outstanding	Basis.	Last Dividend	Date Last Div. Pay'
Allis-Chalmers.....	1 1/4	+ 1/2		\$19,820,000		.....
Allis-Chalmers, pr.....	5	+1 1/4		16,050,300		.....
American Can.....	39 3/4	+1 1/4	Feb. 6	41,233,300	7 cum.	1 1/4 Q.	Feb., 1904
American Can, pr.....	117	+1				.....
Am. Car & Fdy.....	58 1/2	-2 1/4	June 27	30,000,000	2	1 1/4 Q.	Apr., 1912
Am. Car & Fdy., pr.....	117 1/2	- 3/8		30,000,000	7 n. c.	1 1/4 Q.	Apr., 1912
American Loc.....	42 3/4	-1 1/4	Oct. 15	25,000,000	5	1 1/4 Q.	Aug., 1908
American Loc., pr.....	109	+ 1/2		25,000,000	7 cum.	1 1/4 Q.	Apr., 1912
American Ship.....	50 7/8	.....	Oct. 9	7,600,000	4	2 Q. **	June, 1911
American Ship, pr.....	102 3/4	.....		7,900,000	7 n. c.	1 1/4 Q.	Apr., 1912
Am. Steel Foundries.....	37	- 1/2	Mar. 21	17,184,000	5	1 1/4 Q.	May, 1911
Barney & Smith.....	10	.....	June 4	2,000,000	4	1 Q.	Dec., 1907
Barney & Smith, pr.....	85	.....		2,500,000	8 cum.	2 Q.	Dec., 1911
Bethlehem Steel.....	37 1/2	- 7/8	April 2	14,862,000		.....
Bethlehem Steel, pr.....	71 1/2	-1 1/4		14,908,700	7 n. c.	1 1/4 Q.	Feb., 1907
Cambria Steel.....	43	-1 1/4	Mar. 19	45,000,000*	5	1 1/4 Q.	May, 1912
Cambria Iron.....	44	.....		8,468,000*	4	2 S. A.	Apr., 1912
Chicago Pneumatic Tool.....	52	+3	Feb. 19	6,448,800	4	1 Q.	Apr., 1912
Colorado Fuel.....	28	-2	Oct. 21	34,235,500		.....
Crucible Steel.....	11 1/2	- 3/4	Nov. 15	24,578,400		.....
Crucible Steel, pr.....	82 1/2	-1 1/2		25,000,000	7 cum.	1 1/4 Q.	Mar., 1912
Empire Steel.....	10	.....	Feb. 28	1,254,770		.....
Empire Steel, pr.....	45	+9		2,500,000	6 cum.	2 S. A.	July, 1911
Fay & Egan.....	75	+5	Feb. 20	1,000,000	7	1 1/4 Q.	Nov., 1908
Fay & Egan, pr.....	115	+5		1,000,000	7 cum.	1 1/4 Q.	Feb., 1912
General Electric.....	168	-2 1/4	May 14	77,281,200	8	2 Q.	Apr., 1912
Harbison-Walker.....	39	.....	Jan. 15	18,000,000	2	1/2 Q.	Mar., 1912
Harbison-Walker, pr.....	99	+ 3/8		9,600,000	6 cum.	1 1/4 Q.	Apr., 1912
International Pump.....	30 1/2	- 3/8	Dec. 10	17,762,500		.....
International Pump, pr.....	82 3/4	+ 3/4		11,350,000	6 cum.	1 1/4 Q.	Apr., 1905
Lackawanna Steel.....	29	.....	Mar. 13	34,978,000		.....
Lake Sup. Corp.....	29	-2	Oct. 2	40,000,000		.....
New York Air Brake.....	54	-1	Mar. 13	10,000,000	6	1 1/2 Q.	July, 1911
Niles-Bement-Pond.....	95	.....	Feb. 7	8,500,300	6	1 1/2 Q.	Mar., 1912
Niles-Bement-Pond, pr.....	101	.....		2,000,000	6 cum.	1 1/2 Q.	Feb., 1912
Otis Elevator Co.....	75	.....	Mar. 18	6,358,600	4	1 Q.	Apr., 1912
Otis Elevator Co., pr.....	100	-1		6,375,300	6 n. c.	1 1/2 Q.	Apr., 1912
Pa. Steel.....	60	.....	May 13	10,750,000		.....
Pa. Steel, pr.....	101	+1		20,587,500	7 n. c.	3 1/2 S. A.	May, 1912
Pittsburgh Coal.....	21	-1 1/4	Mar. 12	28,104,600		.....
Pittsburgh Coal, pr.....	88	-2		27,071,800	7 cum.	1 1/4 Q.	Apr., 1912
Pittsburgh Steel Co., pr.....	102 1/4	+ 1/4	Oct. 7	7,000,000	7 cum.	1 1/4 Q.	June, 1912
Pressed Steel Car.....	35	-1 1/4	Feb. 21	12,500,000		.....
Pressed Steel Car, pr.....	102 1/2	- 1/2		12,500,000	7 n. c.	1 1/4 Q.	Aug., 1912
Pullman.....	160	-1	Nov. 13	120,000,000	8	2 Q.	May, 1912
Railway Stl. Spring.....	34 1/2	-2 1/2	Mar. 7	13,500,000	2	1 S. A.	Oct., 1908
Railway Stl. Spring, pr.....	100	.....		13,500,000	7 cum.	1 1/4 Q.	Mar., 1912
Rep. Iron & Steel.....	23	-1 1/2	Oct. 16	27,191,000		.....
Rep. Iron & Steel, pr.....	78 3/4	-1 1/2		25,000,000	7 cum.	1 1/4 Q.	Jan., 1912
Sloss-Sheffield.....	50	-2	Mar. 13	10,000,000	5	1 1/4 Q.	Sept., 1910
Sloss-Sheffield, pr.....	102	.....		6,700,000	7 n. c.	1 1/4 Q.	Apr., 1912
U. S. Pipe & Fdy. Co.....	18	- 3/8	June 26	12,500,300		.....
U. S. Pipe & Fdy. Co., pr.....	55 1/4	- 3/8		12,500,000	5	1 1/4 Q.	June, 1911
U. S. Steel.....	69	-2 3/4	April 15	508,302,500	5	1 1/4 Q.	June, 1912
U. S. Steel, pr.....	112 3/4	- 3/8		360,281,100	7 cum.	1 1/4 Q.	May, 1912
U. S. Steel 5s.....	102 1/4	.....		465,189,500	5	5 Q. †	.....
Va. Iron, Coal & Coke.....	63	-4	Sept. 17	9,073,680		.....	Oct., 1907
Westinghouse Air Brake.....	168 3/4	-1	Oct. 1	14,000,000*		.....	Apr., 1912
Westinghouse Electric.....	75 1/4	-1 1/2	June 12	3,998,700*	7 cum.	1 1/4 Q.	Apr., 1912

Par value of shares, \$100, except those starred (*), \$50.
 **Includes last 1 per cent payment of 4 per cent extra.
 †Stock.
 ‡Include 2 1/2 regular, 1 1/2 extra and 1 special.

year ago. Bonds, exclusive of government bonds, were sold to the amount of \$9,568,000, compared with \$12,434,000 the preceding week and \$20,715,000 the corresponding week a year ago.

Copper Stocks.

New York.—Amalgamated Copper closed 82 3/4, a net loss of 2 1/2.

Boston.—Anaconda closed 42, a net loss of 1; Calumet & Arizona closed 71 1/4, a net loss of 2 1/2; Calumet & Hecla closed 485, a net loss of 8; North Butte Mining closed 27 1/2, a net loss of 4 1/2; Quincy Mining closed 89, a net loss of 3 1/2.

Financial Notes.

The Inland Steel Co. paid the regular quarterly dividend of 1 1/4 per cent, May 10.

The Pennsylvania Steel Co. has declared the regular semi-annual dividend of 3 1/2 per cent on preferred stock, payable May 1.

The Pittsburgh Steel Co. has declared the regular quarterly dividend of 1 1/4 per cent on its preferred stock, payable June 1 to holders of record of May 13.

The United States Steel Corporation has declared the usual quarterly dividends of 1 1/4 per cent on common stock, payable June 29, and 1 1/4 per cent on preferred stock, payable May 29.

The American Radiator Co. has declared the usual quarterly dividend of 1 1/4 per cent on preferred stock, payable May 15, and the usual quarterly dividend of 2 per cent on common stock, payable June 29.

MEN OF THE IRON TRADE

William E. Corey announces the removal of his office to 14 Wall street, New York.

Willard C. Brinton has been appointed mechanical engineer to the Bush Terminal Co., New York.

W. Gillespie has been appointed master car builder of the Central Vermont railway, with office at St. Albans, Vt.

Dr. Richard Borcher, Dusiburg-Ruhrort, Germany, is in the United States studying loading and unloading machinery.

Harry E. Kies, Erie, Pa., has been appointed general superintendent of the Michigan Malleable Iron Co., Detroit, Mich.

Henry M. Lane, one of the editors of *Castings* and *Woodcraft*, published by the Gardner Printing Co., Cleveland, has resigned.

Hoxie & Goodloe, consulting engineers, have moved their New York office from 50 Church street to 59 East Forty-first street.

Nathan Owitz has been appointed manager of the Cincinnati office of the Wheeler Condenser & Engineering Co., Cartaret, N. J.

J. H. Bruce has been elected secretary and treasurer of the Bowler Foundry Co., Cleveland, succeeding H. J. Showe, who recently resigned.

Frederick S. Palmer has been appointed general manager of the automatic engine-stop department of the Metallic Packing & Mfg. Co., Elyria, O.

C. F. Rand, general manager of the Spanish-American Iron Co., has sailed for Cuba to inspect the ore mining operations of his company in that country.

A. Schaeffer, with the American Steel Co. at Chicago, has moved his offices from 1132 Commercial National Bank building, to Room 608, the same building.

B. C. Moise, recently appointed secretary of the National Tube Co.,

Pittsburgh, has been elected to the directorate, succeeding J. D. Culbertson, deceased.

James W. Swent, Oakland, Cal., will have charge of a school for miners, soon to be established by the Cleveland-Cliffs Iron Co., on its Marquette range properties.

J. T. B. Bogardus, president of the Abendroth & Root Mfg. Co., 50 Church street, New York, has returned from a trip to Europe in the interest of the company.

L. Plummer, president, and other officers, were re-elected at the annual meeting of the Northern Chief Iron Co., Wausau, Wis. The company operates mines on the Gogebic range.

James O. Westberg, formerly chief engineer of the isolated plant at Feltman's, Coney Island, has accepted a position as erecting engineer with the Shipley Construction & Supply Co.

H. E. Strohm, with the Colcord-Wright Machinery & Supply Co., at St. Louis, Mo., has succeeded W. A. Daley as manager of the Kansas City branch, 309 Victor building, Kansas City, Mo.

George W. Smith, formerly superintendent of the Ingersoll Milling Machine Co., Rockford, Ill., is now head of the tractor department of the J. I. Case Threshing Machine Co., Racine, Wis.

H. R. Cobleigh has been appointed managing editor of *Power*. He was at one time mechanical editor of the *Iron Age* and was recently manager of publicity for the International Steam Pump Co.

J. B. Mansfield is now general superintendent and engineer of the J. E. Bolles Iron & Wire Works, Detroit. He was formerly manager of the New Orleans branch of the Columbian Iron Works.

Jason Paige, formerly contracting engineer for the Pittsburgh Steel Products Co. at Chicago, is now connected with the sales department of

the McClernan & Co., People's Gas building, Chicago.

H. B. Griffin, vice president of the Doehler Die-Casting Co., Court and Ninth streets, Brooklyn, N. Y., has been placed in charge of the Detroit office of the company, at 1313 Ford building, that city.

E. H. Wheeler, formerly superintendent of the Meadville Malleable Iron Co., Meadville, Pa., has accepted the position of superintendent of the malleable department of the Oliver Chilled Plow Works, South Bend, Ind.

Ralph Hoover, one of the engineering staff of the Dow-Willans-Diesel Engine Co., recently organized at San Francisco, is in Europe studying shop methods in connection with the manufacture of the Diesel marine engine.

W. A. Daley has left his position as manager of the Colcord-Wright Machinery & Supply Co.'s Kansas City (Mo.) branch, to become the manager of the machinery department of the Eccles & Smith Co., San Francisco, Cal.

Fred G. Schenkel has associated himself with the sales force of the Treadwell Engineering Co., Easton, Pa., and will specialize their line of electric steel castings. Mr. Schenkel was formerly connected with the Hess Steel Casting Co.

R. S. Fox, for some time connected with the pig iron firm of Walter-Wallingford & Co., with headquarters in Chicago and Pittsburgh, has severed his connection with this company, effective June 1. Mr. Fox will remain in Chicago.

Charles Waldrich, St. Louis, Mo., who has been connected with the engineering departments of the Pennsylvania and Missouri Pacific railways, is now associated with the Miller Engineering Co., engineer and contractor, Little Rock, Ark.

Alexander H. Johnson, general manager of the Eau Claire (Wis.) works of the A. E. White Machine Co., has been transferred to the com-

MEN OF THE IRON TRADE

pany's Canadian works at Windsor, as general manager. He is succeeded at Eau Claire by Adolph Springer.

T. McHattie has resigned as superintendent of motor power of the Central Vermont railway to become master mechanic of the eastern division of the Grand Trunk railway, at Montreal, Que. He is succeeded on the Central Vermont railway by W. Gillespie.

Henry T. Scott, one of the founders of the Union Iron Works, San Francisco, Cal., visited the plant for the first time in seven years recently, when in company with Charles M. Schwab, president of the Bethlehem Steel Corporation, he made a trip of inspection through the works.

J. W. Swaren, technical advertising man of San Francisco, representing the Joshua Hendy Iron Works, the Columbia Steel Co., the Gorham Engineering Works and the Dow Pumping Engine Co., will take an extended trip to large cities in the east to investigate trade conditions.

A. C. Cook, formerly New York manager for the Warner & Swasey Co., Cleveland, has gone to Europe, where he will remain about two years in the interests of the company. His foreign address will be care of Charles Churchill & Co., 9 Leonard street, Finsbury, London, E. C.

F. D. Dorman has resigned as secretary of the United States Motor Co. to become president of the Steinbock Engineering Co., New York, which has been formed to make moderate-priced motor cars and delivery wagons. His place has been taken by L. E. Latta, formerly secretary of the Maxwell-Briscoe Motor Co.

A. N. Goddard, who has been assistant superintendent of the Morgan Construction Co., Worcester, Mass., for 13 years, has resigned to become superintendent of the Union Twist Drill Co., Athol, Mass. The employes of the Morgan Construction Co. presented him with a solid gold watch and guard before he left.

Charles H. Schaffer, iron and steel man of Marquette, Mich., will be in

charge of the blast furnace being erected at Wells, Delta Co., Michigan. Mr. Schaffer has been a producer of pig iron, in one way or another, for the last 25 years. He had been a charcoal contractor and operator previous to that time.

H. A. Bradley Burgess, for the last five years connected with the Standard Plunger Elevator Co., Worcester, Mass., has been made general manager of the company, the main offices of which have been moved from 115 Broadway, New York, to the Worcester plant. The treasurer's office and a sales office will be maintained in New York.

John F. Keyes, treasurer of the Reed Foundry Co., Worcester, Mass., until its recent consolidation with the F. E. Reed Co., and the Prentice Bros. Co., under the name of the Reed-Prentice Co., has resigned and will take an extended vacation before engaging in other business. He will continue as a director of the Reed-Prentice Co.

J. W. Henderson, former general manager of the Verona Steel Castings Co., a subsidiary of the Standard Steel Car Co., will open offices in the House building, Pittsburgh, to follow the profession of a foundry engineer. Mr. Henderson built the Butler Car Wheel Works at Butler, Pa., and planned the extensions now under way for the Verona Works.

N. V. F. Wilsan, foundry manager at Irondale, Wash., for the Western Steel Corporation, has resigned to accept the position of general manager of the Pacific Coast Steel Co., at San Francisco, Cal. Henry Bevan, formerly superintendent of the open-hearth department for the Western Steel Corporation, has been appointed manager by the Metropolitan Trust Co., New York, to fill the vacated position.

John Harland Nelson has been elected professor of applied science of Worcester Polytechnic Institute, Worcester, Mass., to succeed the late Prof. Edward L. Hancock. Prof. Nelson has been at the head of the department of applied science at Case School of Applied Science, Cleveland.

He is a member of the American Society for the Testing of Materials, and of the Society for the Promotion of Engineering Education.

John Jermain Porter has resigned from the University of Cincinnati and after June 1 will devote his entire time to consulting practice as metallurgical engineer. Mr. Porter will make his headquarters at Staunton, Va., and will give special attention to improving the operating efficiency of blast furnace, foundry, coking and other processes. In this work he will be associated with Charles Catlett, consulting economic geologist, of Staunton.

Peter Donaldson, of James Watson & Co., Glasgow, Scotland, president and managing director of the Dayton Coal & Iron Co., Dayton, Tenn., has been inspecting the company's plant at that place. He recently attended a meeting of the board of directors, which was held in Cincinnati, after which he left for New York from which city he will embark for Scotland. While in Cincinnati, Mr. Donaldson was the guest of Samuel Whitaker, assistant to the managing director, and who has charge of the American interests of the Dayton company.

Cuyler Adams, discoverer of the Cuyuna iron range and president of the Cuyuna Northern railway, expects a rise in the ore market. "The price of non-Bessemer ore may go up 20 or 25 cents within the next 90 days," said Mr. Adams recently on his return from a southern trip. He declared that with the cut of 20 cents there was no profit for the Cuyuna range operators and stated that he did not believe there was much in it for the mine owners of the Mesabi and Vermillion ranges. He expects mining operations to be heavy, but that the ore will be stock-piled. With the heavy consumption of ore by the furnaces, eastern stock-piles would soon be depleted, necessitating a rise in price to attract the Lake Superior ore. The Cuyuna Northern railway will build connecting lines between the Northern Pacific railway and the various mines as soon as they become producers.

MAY CONSOLIDATE

Subsidiaries of Lake Superior Corporation, Says Counsel.

Toronto, Can., May 7.—At a meeting of the city council of Sault Ste. Marie, Ont., recently, Mr. Gibson, counsel for the Lake Superior Corporation, made an important statement regarding the projects of the company. He said that \$12,000,000 had been spent at the steel plant within four years. To meet these expenditures money had been borrowed on short term notes. It was proposed to consolidate several of the subsidiary companies as the Algoma Steel Corporation and to issue \$13,500,000 worth of bonds to meet liens on the property and make extensions, and also to make an additional bond issue which would enable them to double the plant. The city had a lien of \$215,000 on the Lake Superior Power Co., and the proposal submitted was to double this liability, the city receiving the new bonds in exchange for its debentures. A resolution was adopted approving of the plan upon the understanding that the company would undertake a new bond issue of \$30,000,000 to cover existing liabilities, assure additions and improvements amounting to several millions of dollars and doubling the capacity of the steel mills.

Obituaries

William Ireton, who was plant superintendent of the Camden Iron Works, Camden, N. J., for 25 years, died recently. He was 72 years old. The plant was closed May 1 in respect to his memory.

George H. Waters, president of the Geo. H. Waters & Co., Philadelphia, dealers in structural steel, was stricken May 1 with a cerebral hemorrhage while fishing in a trout brook near Canadensis, Pa., and died a few hours later. He was 36 years of age.

Edward J. Major, president of the Major Mfg. Co., Montreal, Can., manufacturer of wire products, died at Ste. Agathe des Monts, Que., May 1, aged 64. He was well known in Montreal business and social circles. He established the Major Mfg. Co. in 1884.

James Rawle, president of the J. G. Brill Car Co., Philadelphia, died May 1 at Bryn Mawr of pneumonia. He was born in Lancaster, Pa., in 1842 and graduated as a civil engineer from the University of Pennsylvania in 1861. In 1872 he became a partner in the firm of J. G. Brill & Son,

manufacturers of railroad cars, and subsequently built up a large plant for the building of electric street cars. In 1887 the firm became a corporation under its present title with Mr. Rawle as secretary and treasurer. He was elected president in 1906 upon the death of John M. Brill.

Albert Braband, for 20 years manager of the foundry department of the Brand Stove Co., Milwaukee, and more recently inspector of the foundry of the International Harvester Co., Milwaukee, died recently after a six months' illness. He was 69 years old.

Charles E. Hill, who has been in the stove and heater business at 526 South Second street, Philadelphia, for some time, died April 28. His father established the plant 60 years ago. Mr. Hill had been prominent in public affairs and was president of the South Second Street Business Men's Association.

Otto Jahn, for many years chief engineer of the Vilter Mfg. Co., Milwaukee, died recently, aged 59. He was born in Germany and was a graduate of the Royal Institute of Technology, at Chemnitz, and the Polytechnic Institute, at Berlin. Upon coming to America in 1879, he became identified with the American Locomotive Co., Scranton, Pa. Mr. Jahn was superintendent of the Morton Frog & Crossing Co., Chicago, for six years. He was employed as designer for the Fraser & Chalmers Co., now the Chicago works of the Allis-Chalmers Co. Mr. Jahn joined the Vilter company in 1889.

James Osborne, general superintendent of the Pacific division of the Canadian Pacific railroad, died in Vancouver, B. C., May 1. He was 50 years old. Mr. Osborne was a member of the C. P. R. staff since 1883, when he became chief mechanical clerk for the road. In 1906 he was appointed general superintendent of the Ontario division, with headquarters at Toronto, where he remained until his last advancement, two months ago.

Opened Office.—The new Apollo Steel Co., which has been forming for some time at Apollo, Pa., has applied for a charter in Harrisburg, and has opened temporary offices at Apollo. The application for the charter is signed by Robert Locke, J. H. Jackson, J. E. Gallagher and Charles P. Wolfe. Robert Locke, who was formerly general manager of the Allegheny Steel Co., will be in charge of the new plant.

SHOWS DEFICIT

Annual Report of the Pennsylvania Steel Co.

The report of the Pennsylvania Steel Co. for the 12 months ended Dec. 31, 1911, shows a deficit of \$609,583, compared with a surplus of \$58,581 the previous year. The total income was \$2,979,861, against \$4,029,125 the previous year, or a decrease of \$1,049,264. The income account for the year compares as follows:

	1911.	1910.
Net income	\$2,729,499	\$3,779,824
Other income	250,362	249,370
Total income	2,979,861	4,029,125
Interest on bonds, etc.	1,091,536	1,702,918
Depreciation	1,058,636	855,403
Preferred dividends	1,439,256	1,412,293
Deficit	609,538	*58,581

*Surplus.

The companies produced, in gross tons, compared with 1910, the following:

	1911.	1910.
Coal, tons	813,000	790,000
Coke, tons	653,000	781,000
Iron ore, tons	1,587,000	1,367,000

Reviewing the expenditures for the year, President E. C. Felton reports to the stockholders as follows:

In 1911 expenditures for capital account amounted to \$1,177,940, of which \$404,846 was expended on the mining properties, principally for new coal and ore handling bridge, new traveling crane and runway and additional miners' houses in connection with the new mines in Cuba; and for additional coal lands and extension to power plant in connection with your coal mining properties in Pennsylvania. On manufacturing properties there was expended for capital account \$773,094, principally for additional hot stoves and boilers at blast furnaces, for remodeling blast furnace and for metal receivers and traveling cranes.

Harriman Lines Buy Motive Power Heavily

The Harriman lines have placed an order with the Baldwin Locomotive Works for 115 locomotives which include 15 locomotives of the Mikado, 15 of the Mallett and 13 of the Pacific types, 20 six-wheel switching engines and ten ten-wheel engines. The same system has also placed a small order with the American Locomotive Co. This is one of the largest locomotive orders of the year. President Johnson, of the Baldwin Locomotive Works, states that the plant is now running at about 60 per cent of capacity.

The Westinghouse Electric & Mfg. Co. has taken orders for two 60-cycle, 2,200-volt generators for the Moundsville, W. Va., city electric plant.

COKE RATE HEARING

Develops Some Very Interesting Testimony.

In the hearing last week before the Interstate Commerce Commission on the freight rate complaint of the Connellsville Coke Producers' Association against the Baltimore & Ohio, Pennsylvania and P. & L. E. railroads, R. H. Large, general coal agent of the Pennsylvania lines at Pittsburgh, was on the witness stand.

He testified that there are practically no terminal allowances on coke, his company being on the originating points. He said that east of Pittsburgh, the amount of coal and coke transported consisted of 54 per cent of the total amount of freight carried, and the earnings amounted to 51 per cent. The rate on coke from Connellsville, Pa., to Youngstown, O., is \$1.35 a ton, the cost of the service to the railroad being \$1.05 a ton.

Discard Wooden Cars

Considerable discussion developed regarding the makeup of the trains and the respective capacities of the wooden and steel cars. He said that trains made up of wooden cars consisted of 55 cars to the train, while the steel cars hauled were in trains of 40 cars. Therefore, while the trains of wooden cars were longer and the cars smaller, and the trains of steel cars shorter and the cars larger, yet the cost of transportation was about the same on the two kinds of equipment. The Latrobe region is nearer the eastern markets than are the Connellsville regions. The coal of Latrobe produces coke inferior to the Connellsville product. Because of the inferior quality of Latrobe coke and the difficulty of marketing it, the transportation rate is lower so as to equalize conditions.

J. B. Nesse, of Cleveland, general coal and ore agent of the New York Central Lines and formerly general freight agent of the P. & L. E., testified that the coke product of the Connellsville region is marketed chiefly in Pittsburgh, Buffalo, Chicago, Cleveland and the Mahoning and Shenango valleys. It is the largest coke field in the United States. The P. & L. E. does not reach the ovens in the Connellsville region directly; but by a reciprocal switching

arrangement with the Pennsylvania and B. & O. railroads, the P. & L. E. is enabled to handle coke from these ovens to points on its line. A switching charge was made to the P. & L. E., this charge being included in the general published rate. He said that the cars are assembled at two or three points and are moved in trainloads as far as possible. The cost of transportation has increased in recent years. This is due partly to the use of increased and improved equipment for handling coke. Since December, 1906, the New York Central Lines have expended \$5,286,150 on these improvements and the L. S. & M. S. railroad has expended \$2,052,000 for the same purpose. These cars and equipment are used exclusively for the transportation of coke. This company has stored or destroyed nearly all its wooden cars. It has also stored some steel cars, there being no use for them at present on account of the depression in the iron and steel business.

Others Would Want It

Asked as to the effect of a probable reduction in rates on coke from Connellsville, the witness said that it would cause a demand from the West Virginia coke shippers for a like decrease and the manufacturers of by-products would also make demands for a lower rate.

M. F. Saxman, general manager Connellsville-Mason Coke Co., of Harrisburg, Pa., said that the coke made there is inferior as compared with the Connellsville product. It is too high in ash content, which, he said, increases the cost of making iron. This concern is owned by the Central Iron & Steel Co., of Harrisburg, and was bought so as to furnish a supply of coke to the Central company's blast furnaces. The Central company, he said, is in the hands of receivers and it only operates the coke ovens so as to keep the organization intact. If they should be closed, they would never re-open again, he declared. The coal supply is becoming exhausted and the company has had to buy coke from other points. The witness declared the poor quality of coke which his company manufactured adds 60 cents to the cost of making a ton of pig iron. This was the case when the ash content of the coke was 15 per cent as against coke containing only 10 per cent of ash.

Comparison of Rates

Mr. Large submitted a table of figures showing a comparison of rates on coke from Connellsville to various

points between the years 1900 and 1911. This table showed that a number of decreases had been made in rates and that in many instances the rate for the short haul was the same as for a longer haul.

Mr. Ellis attacked the tables and stated that if the comparisons had been made over the period from 1901 and 1911 large increases would have been shown. For instance, the rate from Connellsville to Buffalo, as shown in the table comparison between 1900 to 1911 was increased only 10 cents or from \$1.75 to \$1.85 a ton; while as a matter of fact the rate between these points, as compared between 1901 and 1911, increased 35 cents a ton or from \$1.50 in 1901 to \$1.85 in 1911. Ellis also developed the statement that during 1901 the rates to nearly all points under consideration were much lower in 1901 than in 1900, and when the rates prevailing in 1901 were compared with those of 1911, the increases were about 30 per cent higher than when compared with 1900.

The witness declared that these fluctuations were caused by the periods of commercial and industrial depression, and other trade conditions which caused a falling off in prices. During these periods the railroads reduced their rates, and when normal trade conditions returned the rates were increased. The increases in rates, as compared between 1901 and 1911 were caused partly by the increased cost of transportation, including higher wages and partly by the greater cost of equipment.

Mr. Ellis asked the witness to explain why the rates to many points were the same for a longer than a shorter haul. Witness explained that this was accounted for by the policy of the railroads in equalizing the cost of assembling raw material so as to place all producers on the same basis. He said that it was necessary to group the rates, and that many things entered into their consideration, including the quality of the raw material, its distance from the assembling point, etc. Mr. Large, in explaining the fluctuations in rates, declared that the competition on coke is no longer between Cleveland and Erie, but between the eastern points.

Mr. Ellis then took the witness to task in an effort to secure answers to his questions regarding a reduction of rates which the attorney declared was not in fact a reduction. He put the question in several different forms when Fred D. McKenney, counsel for the Pennsylvania railroad, interposed strong objection to what he termed

Mr. Ellis' "insulting attitude to the witness."

Mr. Large submitted some rates charged on coke, as follows:

	Distance.	Rate 1900.	Rate 1911.
Buffalo	315	\$1.75	\$1.85
Black Rock	319	1.90	1.85
Tonawanda	326	2.00	1.85
Erie	216	1.50	1.65
Harrisburg	253	1.90	1.70
Lebanon	278	2.05	1.85
Reading	306	2.15	1.95
Birdsboro	316	2.15	1.95
Leesport	314	2.15	1.95
Pottstown	325	2.15	1.95
Phoenixville	337	2.15	1.95
Swedeland	346	2.25	2.00
Bethlehem	357	2.20	2.00
Phillipsburg	369	2.30	2.10
Wharton	448	2.35	2.10
Sparrows Point	284	2.25	2.15
Philadelphia	364	2.25	2.15
Newark	427	2.15	2.35
Jersey City	434	2.45	2.35
Troy, N. Y.	523	2.75	2.80
Port Henry	604	3.38	2.80
Standish	693	3.00	2.90
Johnstown	85	.83	.75
Pittsburgh	67	.75	.80
Robesonia	294	1.80	1.90

The rates from the Latrobe, Pa., region to all destinations east or north of Lewiston Junction and Lock Haven, moving via those junctions, are 20 cents per ton less than the rates from the Connellsville regions.

The rates from the mountain region to the same territory are 20 cents per ton less than from the Latrobe region, or 40 cents per ton less than from the Connellsville regions. The distance from the Latrobe region to the east is 48 miles less than from the Connellsville regions. The distance from the mountain region to the east is 64 miles less than from the Latrobe region.

H. M. Matthews, general coal and coke agent of the B. & O. railroad, was asked whether in his opinion his company's coke rates are "discriminatory." The rates in question are these:

Rates on B. & O. on coke from Connellsville and West Virginia region to following points:

	Number miles.	Con'l W. Va. region.	W. Va. region.
Buffalo	354	\$1.85	\$2.15
Toledo	375	1.95	1.95
Detroit	453	2.10	2.10
Gary	522	2.50	2.50
South Chicago	531	2.50	2.50
Joliet	559	2.50	2.50
Bay View	635	2.70	2.70
Mayville, Wis.	690	2.75	2.75
Cleveland	231	1.65	1.65
Youngstown	144	1.35	1.35
Columbus	266	1.65	1.65
Canton	217	1.45	1.45
Pittsburgh	71	.80	1.00
N. Cornwall	303	1.85	1.65
Robesonia, Pa.	315	1.90	1.70
Reading	327	1.95	1.75
Harrisburg	275	1.70	1.50
So. Bethlehem	368	2.00	1.80
Philadelphia	376	2.15	1.95
Sparrows Point	294	2.15	1.95
Phillipsburg, N. J.	380	2.10	1.90
Newark	446	2.35	2.15

After some controversy as to the meaning of the word "discriminatory" the witness answered the question by saying:

"No, I do not believe that these rates are discriminatory."

The hearing adjourned Saturday for probably three weeks.

BLAST FURNACE

Will Soon be Completed by Stephenson Charcoal Iron Co.

Marquette, Mich., May 6.—By the first of June, it is expected, the blast furnace being erected at Wells, Delta county, by the Stephenson Charcoal Iron Co., will have been completed and gone into commission. With the stack completed, upper Michigan will have seven plants of the kind, three of these being at Marquette and vicinity, and one each at Gladstone, Manistique and Newberry. Of the six existing furnaces, two are out of blast—the Carp River and Chocoy stacks at Marquette, the former owned by the Cleveland-Cliffs Iron Co., and the latter by the Lake Superior Iron & Chemical Co.

The controlling factor and moving spirit in the furnace project at Wells is Charles H. Schaffer, of Marquette. Mr. Schaffer is superintending the erection of the plant and will have general supervision of its operations, once it is put in blast. Interested with him in the company are Senator Isaac Stephenson, of Marinette, H. A. Upham, of Milwaukee, G. T. Stephenson, C. W. Kates and R. E. MacLean of Wells, J. R. Van Evera, of Marquette, and others.

The furnace is being erected on a site immediately adjoining the plant of the Mashek Chemical & Iron Co., which will furnish all the charcoal used as fuel and which has enlarged its capacity somewhat, to meet this new demand. The Mashek company, which is controlled by Senator Stephenson and his associates, has contracted to deliver the charcoal in bins at the furnace, in quantities sufficient to insure the continuous operation of the stack. About 6,000 bushels of coal will be required daily. The product of the furnace plant will be limited to pig iron, as the by-products that are manufactured from the smoke from kilns will be worked up by the Mashek company.

The furnace plant is of modern design, of 70 tons daily capacity, and as it embodies all the latest ideas in construction it is expected that it will be a low-cost producer.

Build Manganese Plant in Virginia

With the opening of favorable weather plans have been made to begin work at the mine of the Piedmont Manganese Corporation, eight miles east of Lynchburg, Va. The Piedmont property was recently purchased by a syndicate headed by N. R. Livingston, of New York City, and Mr. Ireland, of London, from D. W. Myers, of Lynch-

burg. The purchase price was \$500,000. The plant will cost from \$250,000 to \$350,000. In addition to the 315 acres purchased from Mr. Myers, the syndicate has options on 1,500 acres of adjoining land. The output of the mine will be used largely for the manufacture of steel in mills around Pittsburgh and for export to Europe. The remainder will be ground at the plant to be erected at the mine for use in paints, for glass manufacture, for disinfectants, brick coloring and for dry batteries.

EMINENT JOURNALIST

Was Brother of Dr. J. E. Stead—W. E. Hopkins Lost on Titanic.

Office of THE IRON TRADE REVIEW, Prince's Chambers, Corporation St., Birmingham, Eng., May 1.

America and Europe have combined in a common grief over the loss of the Titanic but fortunately the personal losses did not come home so nearly to the trade as in some other great catastrophes. It may be interesting to Americans to know that the tragic death of W. T. Stead came home personally to one of the most famous men in the iron trade, Dr. J. E. Stead, F. R. S., of Middlesborough, a man of world-wide reputation, who was a brother of the eminent journalist, and whose fame as a metallurgical chemist was almost as great as that of his brother in the field of journalism. There has been widespread sympathy with Dr. Stead in this great personal loss.

Among the business men on board was William E. Hopkins, managing director of W. & T. Avery, Ltd., of Birmingham. His connection with the Soho Foundry brought him in intimate relation with America. Some years ago, Walter Chamberlain, who is a brother of Hon. Joseph Chamberlain, and the chairman of Averys, agreed with Mr. Hopkins that the only way to overcome hostile American tariffs and to do a profitable trade in weighing machines in the United States was to build an American factory. Mr. Hopkins was largely responsible for the building of the factory at North Milwaukee, 70 miles distant from Chicago, and it was for the purpose of visiting these works that he was journeying to America. Mr. Hopkins was an enthusiast on commercial education.

The Henry M. Meyer Co., 110 South Howard street, Baltimore, has been appointed representative in that section for the Chain Belt Co., Milwaukee, and will handle that concern's line of concrete mixers, elevators and distributing systems.

INTEREST TAKEN OVER

Pittsburgh Steel Foundry Co. Acquires Equipment Lines.

The Pittsburgh Steel Foundry Co., with works at Glassport, Pa., and principal office at Pittsburgh, is enlarging its plant to increase its facilities for designing and manufacturing the Pittsburgh Equipment Co.'s complete line of cast steel equipment for freight car bodies and freight car trucks. The former company has increased its capital stock to \$1,000,000. The majority of the stock of the Pittsburgh Equipment Co. has been owned by the Steel Foundry company. The minority interests have also recently been acquired by the Steel Foundry company and after May 1 the business of the Pittsburgh Equipment Co. will be conducted under the name of the Pittsburgh Steel Foundry Co., which will assume all current contracts.

Rebuilding Stoves at One Blast Furnace

Steelton, Pa., May 6.—The Pennsylvania Steel Co. is rebuilding the stoves of No. 3 furnace. The relining of this furnace is nearing completion and it will be placed in operation as soon as possible.

The rail mill department is now the busiest at the plant and the probabilities are that the present month will be the record one for output at that department. The mill is using nearly the entire output of the open hearth.

Buying Steel Coaches

Accompanying the more active purchasing of freight car equipment by the railroads, there is considerable movement in the steel coach market. The Pittsburgh street railways are inquiring for 50 steel street cars and the city of San Francisco is out with an inquiry for 45 cars of similar type. The Norfolk & Western railroad continues to negotiate for 65 passenger coaches. The Seaboard Air Line has placed three postal cars with the Pullman Co.

Rail Body to Meet.—The sub-committee of six steel rail manufacturers and railroad executives which is considering the recommendations calculated to improve the quality of steel rails, will hold another meeting in New York City, Thursday, May 16.

At the last session of this committee, little was accomplished because of the enforced absence of several of the railroad representatives.

SHOW PROFITS

Statement of Steel Co. of Canada For Year 1911.

The annual statement of the Steel Co. of Canada for 1911 shows profits amounting to \$1,373,522, after deducting charges for repairs, maintenance and improvements. After allowing for depreciation, interest on bonds, etc., a balance of \$792,422 remains, from which was paid preferred dividends to the amount of \$454,741, leaving a balance of \$337,481, which, added to the amount carried forward from 1910, makes a total of \$583,599 to the credit of the profit and loss account.

Holds Annual Meeting

At the annual meeting of the stockholders of Steel & Radiation, Ltd., Toronto, the following board of directors was elected: Sir Henry N. Pellatt, Sir Wm. Mackenzie, Sir John M. Gibson, Frederick Nichols, Gordon Perry, Hubert H. MacRae, Capt. Reginald Pellatt, Samuel Trees, Thomas Southworth and Grant Hugh Browne. The directors organized for the year by electing these officers: President, Sir Henry M. Pellatt; first vice president, Sir John M. Gibson; second vice president, Frederick Nichols; secretary, S. W. Howard; treasurer, John J. McGuire, and general manager, Robert J. Cluff. President Pellatt announces that the new boiler and radiator plant at St. Catharine's, Ont., will be completed and in operation by 1913.

Orders 6,000 Cars

Chicago, May 4.—It is officially reported that the St. Louis & San Francisco railroad has ordered 4,600 coal cars, 400 Hart convertible cars and 1,000 box cars from the American Car & Foundry Co.

Bureau Brothers, bronze statuary and founders, Philadelphia, advise that they have sold their present property and purchased a 100 x 194-foot lot at Twenty-third street and Moreland avenue, that city. A two-story plant, with office, studio and drafting room on the second floor, and with foundry and finishing shop and machine room on the first floor of the main building and in detached buildings, will be erected on this site.

TO INCREASE EFFICIENCY

By Encouraging Employees to be Prompt.

D. P. Lamoreaux, president of the Beaver Dam Malleable Iron Co., of Beaver Dam, Wis., has just instituted a plan upon which he has been working for two years to increase efficiency and encourage promptness among the 1,000 workmen in the big plant. The plan was announced to employees not working on a salary basis in the following notice, effective May 1:

The whistle blows at five minutes of seven and five minutes of one, and all those who have lost no time during the week, and register on the time clock at or before five minutes of seven, and at or before five minutes of one, and are at work at their bench or places of work when the seven and one o'clock whistle stops blowing, will get the benefit of an extra hour pay. A man will fail to get the extra hour in case his clock card shows the contrary.

In addition to getting the extra hour for prompt attendance during the week a man who is neither absent nor late during the regular working hours for an entire month will, on the same conditions that entitle him to the extra hour on Saturday be entitled to one half-day's vacation with pay, but before one can take this vacation he must have earned twelve half-days.

Sir Hugh Bell on Parliamentary Interference

Sir Hugh Bell, Bart., a former president of the Iron and Steel Institute and one of the best known men of the British iron and steel industry, presided at the recent annual meeting of Bell Brothers, at Middlesbrough. Sir Hugh, after referring to large extensions and improvements necessary to maintain employment for their 6,000 men, referred to the ever increasing burdens on the iron and steel industry in the shape of rates and workmen's compensation. The eight hours' act had been disastrous to the company's operations. Parliament had also determined to legislate on the matter of wages, and to impose a statutory wage. Fortunately there had not been placed in the minimum wage act a schedule of rates, and, therefore, they might hope that prudent counsels would prevail at the joint district boards and that the minimum rates fixed would not injure the industry as seriously as might otherwise have been feared.

W. L. Fleisher & Co., Inc., have succeeded in New York to the business of Francis Bros. & Jellett, Inc., engineers, at 156 Fifth avenue, New York City.

BRITISH IRON TRADE

Years Since Pig Iron and Steel
Were so Scarce.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., April 27.

Pig Iron.—Resuming operations at the blast furnaces is proving a slow business, and, up to the present, not more than one-fifth have recommenced work, while of these many are not yielding anything like a normal output. The trouble is with the coke supply, which is very scarce. This applies not only to Cleveland, but also to all iron-making districts. There is no hope of a normal output for a long time to come. In the meantime, stocks are being sharply reduced, the total decrease this month being 61,000 tons. The amount in store is now below 400,000 tons, and 100,000 tons of iron has been got rid of in six weeks. The stocks now amount to only two-thirds of what they were in August. Prices are remarkably firm, in spite of a certain amount of profit taking by speculators. The latest quotation for warrants is 54s 2d (\$13.26), with 54s 6d (\$13.34) one month and 54s 11d three months. Buying is strictly for immediate requirements and urgent needs, owing to the belief that the present state of things is artificial, and that there will be a leveling when furnaces fairly resume operations. Makers decline to make promises as to date of delivery. Some surprise has been expressed that American pig iron has not found its way here, and American reports have been eagerly scanned, with a view to judging the possibilities of purchase in the American market; but it is concluded that with the comparative scarcity on the American side prospects of getting foreign material are not particularly bright.

Finished Iron and Steel.—It is some years since the demand for finished material was so great as it is at present. In the Birmingham district, particularly, warehouses are empty, as the result of five weeks' complete stoppage of supplies, and many iron-consuming trades in the city find difficulty in keeping in operation. There is very keen pressure for delivery. It is many years since the Staffordshire ironmaster was in such a flourishing position. The recent advance of marked bars to £9 is readily paid, and for unmarked bars, sales have been effected on the basis of £8 per ton, or about £2 per ton increase from the minimum. Consumers do not trouble much about prices, if they can

get deliveries. Galvanized sheets show considerable improvement with prices from £12 5s to £12 10s and the mills are booked heavily forward. The great demand next to that of pig iron is for steel. There is not a description of finished steel but is slightly dearer than it was even a week ago; consequently competition has been much relieved, as compared with the conditions a little while ago. The most urgent need at the Birmingham market on Thursday was for billets, and half finished steel generally. Wire makers are becoming very anxious over the supply of wire rods, for which they are almost wholly dependent upon continental supplies. Prices are becoming very high for such small supplies as are available. So few steel works have billets to spare from their own finished mills that it is almost impossible to get them. There have been further efforts to obtain American supplies; but within the last day or two local merchants have been informed from America that at present freight shipments of American billets cannot be profitably made.

Chicago Foundrymen's Club

Accidents in the foundry and appliances for their prevention will be discussed by the members of the Chicago Foundrymen's Club, at the next monthly meeting, to be held Saturday, May 11, at the Great Northern hotel. W. H. Cameron, manager of the casualty department of the American Steel Foundries, will open the discussion and Dr. A. M. Harvey, factory physician with Crane Co., also will relate his experiences and will describe the work being done at that plant.

Final arrangements have been made for the annual reunion which will be held on Saturday, May 25. A steamer has been chartered for the day, which will convey the members and their guests to the Gary plant of the Indiana Steel Co., and upon returning in the evening a banquet will be held at the Auditorium hotel.

Big Electric Sign.—The Bostwick Steel Lath Co. has had placed on top of its plant at Niles, O., a large and cleverly designed electric sign whose illumination can be seen for miles around. It is 15 feet high and 30 feet long and contains 624 5-watt lights. Arranged in the shape of the figure 8 are 158 red lights, encircling the words "Truss Loop". Over the loop is the word "Bostwick" and under it the words "Metal Lath."

WILL ISSUE STOCK

Pittsburgh Steel Co. Will Proceed
With Building Program.

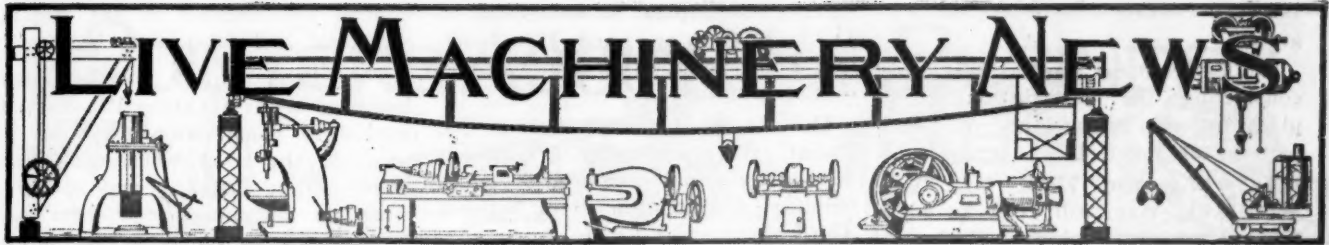
Pittsburgh, May 7.—A special meeting of the stockholders of the Pittsburgh Steel Co. was held a few days ago, and the proposition to issue \$3,500,000 of new preferred stock by this company was approved. The directors of the company held a meeting immediately after to arrange for the issue of the stock.

The company will proceed with its very extensive program for improvements at Monessen, a large portion of which is under way and includes two blast furnaces, open-hearth furnaces and blooming mill, and also a number of other improvements of like character. It is understood that the new stock has already been underwritten by eastern bankers, and at a very satisfactory price.

Program for the Norfolk
Conventions

The National Supply and Machinery Dealers' Association and the Southern Supply and Machinery Dealers' Association, which will hold their conventions jointly with the American Supply and Machinery Manufacturers' Association, at the Monticello hotel, Norfolk, Va., May 13, 14 and 15, have announced their programs. W. T. Todd, secretary of Somers, Fitler & Todd Co., Pittsburgh, will address the National dealers' association on the "Modern Supply and Machinery Dealer as a Necessary Adjunct to the Manufacturer in the Distribution of His Products". Other topics to be discussed by both associations will include cost of handling small orders in broken packages, resale prices, distribution of advertising literature, problems of salesmanship, etc. W. B. Yost, manager of the supply department of the Lockwood-Luetkemeyer-Henry Co., Cleveland, will discuss "The Cost of Doing Business and the Increase of Profits Needed to Meet the Same". M. B. Barkley, first vice president of the Cameron & Barkley Co., Charleston, S. C., will speak on yearly contracts with consumers before both the National and Southern dealers' associations. A joint session with the Manufacturers' association will be held on the morning of May 14, at which time addresses on 1-cent letter postage and the national banking problem will be presented. The program for the National association has already been announced.

LIVE MACHINERY NEWS



In New York the machinery business shows further expansion. The month of May bids fair to be the best period for at least a year. The buying has been heavier than it has since the early part of 1911. Railroads, market reports indicate, are showing unusual interest in shop equipment.

In Pittsburgh the machinery market is showing a steady improvement, but prices still are unsatisfactory. No marked improvement is expected until pres-

ent conditions continue some time. Large contracts have not been numerous, but small business seems to be coming out.

In Chicago and other western markets, manufacturers of special machine tools, turret lathes and automatic machines are enjoying somewhat better business than those making standard lines.

In Cleveland the machine tool business has been fair. There have been numerous small sales, but no exceptionally large ones.

Water Works

The city of South Bend, Ind., is in the market for the following equipment for its waterworks: Two water tube boilers, complete with fittings and auxiliaries; two 5,000,000 gallons daily capacity Corliss cross-compound pumping engines and two 8,000,000 gallons daily capacity low-service pumps.

We are advised by Carl E. Stromquist, superintendent water and light department, Coffeyville, Kan., that Coffeyville has voted a bond issue of \$130,000 and will be in the market for two 4,000 gallons per minute, low-service pumps, direct-connected to 75-horsepower, slip ring induction motors; one 3,000 gallons per minute high-pressure pump, direct connected to a 200-kilowatt, synchronous motor; one 300-kilowatt, low-pressure turbo-alternator with condenser and approximately 100 gate valves. The work is in charge of Worley & Black, consulting engineers, Reliance building, Kansas City, Mo.

Machine Tools

The Harley-Davison Motor Co., Milwaukee, Wis., manufacturer of motorcycles, will be in the market for new machine shop equipment for its Milwaukee plant in the near future.

The McEwin Co., Wellsville, N. Y., has ordered a number of machine tools and special machinery for shipment to Tulsa, Okla. The company will equip a plant there for the manufacture of oil well machinery. So far about \$40,000 has been expended for equipment.

A large part of the \$60,000 machine tool list put out by the Norfolk & Western Railroad Co. early in March, has been placed in the New York market. The business was divided

between two of the largest houses in the local trade. Other recent buyers of machine tools include the American Locomotive Co. for its Providence, R. I., plant, and the Morrow Mfg. Co. The latter company will construct an addition to its plant at Elmira, N. Y., which, including equipment, is estimated to cost \$100,000.

Power Plant Equipment

Alameda, Cal., is considering a bond issue of \$150,000 for a new municipal electric lighting plant.

J. H. Van Brunt, general manager St. Joseph Railway, Light & Power Co., St. Joseph, Mo., announces that this concern will install a 3,000-kilowatt generator in its power plant.

The Barbourville Light, Heat & Power Co., Barbourville, Ky., is considering making a number of improvements in its plant. The control of the company has passed from T. F. Gibson to George W. Tye and A. D. Smith.

The Mogul Wagon Works, Hopkinsville, Ky., is considering installing a new engine in its power plant. Temporary facilities for using electric power have been secured. John F. Bible is general manager of the concern.

The Kentucky Public Service Co., which has been improving its Bowling Green, Ky., plant, has taken up the improvement of its Frankfort, Ky., property, which was purchased from the Capital Gas & Electric Light Co., and will probably build a new power house.

L. R. Putnam, general manager of the Ashland Steel Co., Ashland, Ky., has announced that numerous improvements are to be made in the plant of the company. A number of electrically operated cranes will be installed, and additions will be made

to the power plant, reciprocating engines being required.

The West Penn Railways Co. is adding eight new boilers with a total of 2,960 horsepower to its power plant at Fayette City, Pa., which will give this plant a total of 30 boilers, and will provide additional power for transmission to Connellsville, Charleroi and Washington, Pa. An additional 6,000-kilowatt generator also has been ordered.

The Black River Water & Power Co., a West Virginia corporation, with \$27,000,000 capital, the general offices of which are in Pittsburgh, is preparing to build large dams, storage reservoirs and power plants in the Black Fork river, in Tucker county, W. Va., from which point power will be developed and transmitted to distant points. The investment will run into several million dollars.

New Construction

Work on plans for a municipal auditorium to cost \$500,000 has commenced at Oakland, Cal.

The Roswell Gas & Electric Co., Roswell, N. M., will build a steel gas tank of 50,000 cubic feet capacity.

The Philadelphia Forge & Steel Co., Philadelphia, will build a one-story addition at Minor and Bleigh streets, 28 x 80 feet.

The Midvale Steel Co. will erect a steel inspection building, 46 x 100 feet, with a wing, 100 x 109 feet, at its Nicetown, Philadelphia, plant.

Architect W. H. Weeks, San Francisco, is preparing plans for a \$50,000 steel frame theater and office building to be built at Watsonville.

The New London Ship & Engine Co., Groton, Conn., announces it is building additions of 100 x 107 feet and 100 x 130 feet to its plant. New shops will be used principally for

the construction of heavy oil engines.

Wolff Brothers, Racine, Wis., are considering the construction of a plant for the manufacture of metal patterns at Joliet, Ill.

The Wisconsin Metal Mfg. Co., West Allis, Wis., will erect an addition to its plant which will double its capacity.

The Moore Drop Forging Co., Springfield, Mass., announces that the addition to its factory is nearing completion.

The Sanders Furnace Co., Fort Dodge, Ia., warm air furnaces, is erecting a new furnace shop, 24 x 59 feet, three stories.

The Macallen Co., Boston, advises that it will not be ready to give out information regarding the addition to its plant before June 1.

The Wheeling Traction Co., Wheeling, W. Va., is considering plans for the erection of additional shops at Wheeling at a cost of \$100,000.

The Ohio Wood Preserving Co., Orville, O., has awarded a contract for a corrugated iron and steel wood preserving plant to the Pittsburgh Bridge & Iron Co.

The Modern Foundry Co., Oakley, Cincinnati, will build an addition to its plant, which will be 36 x 190 feet, one story, of brick and steel, with a saw-tooth roof.

The Eastern Blower & Sheet Metal Works, Richmond, Va., has begun equipping a building for the manufacture of metal sash and doors. General sheet metal work will be done.

The McClintic-Marshall Construction Co., Pittsburgh, has taken a contract for erecting an addition to the Ingersoll-Rand Co. plant, in course of construction at Phillipsburg, N. J.

The American Well Works, Aurora, Ill.; reports that its two plants are almost completed. Contracts for machinery and material have been awarded.

The Sheeler-Hemsher Co., Philadelphia, advises it will build a two-story brick addition, 30 x 100 feet, and a one-story brick storeroom, 13 x 53 feet, some time in May.

A company composed of Lyman Stewart, president of the Union Oil Co., William R. Statts, S. I. Merrill and J. S. Torrence, of Los Angeles, is planning to construct a steel mill at Wilmington, Cal.

The Harlan & Hollingsworth Corporation will replace two of its old car shops at Wilmington, Del., at an expenditure of \$250,000. This will increase the capacity of the plant to 240 passenger cars a year.

The American Railways Co., Philadelphia, it is reported, expects to

erect a power plant at Bridgeton, N. J. H. J. Crowley, Land Title building, Philadelphia, is general manager of the company.

The Racine Economy Spring Co., Racine, Wis., has awarded contracts for the construction of a new factory building on Wisconsin street, between Third and Fourth streets, to be four stories high, 40 x 60 feet in size.

The Kentucky Solvay Coke Co. is to establish a large plant in Ashland, Ky., for the manufacture of coke and by-products. The estimated investment is to be close to \$1,000,000, it is stated by those connected with the enterprise. A 65-acre tract for the plant has been secured.

The Federal Rubber Mfg. Co., Milwaukee, Wis., has awarded the contract for the construction of a \$125,000 addition to its plant in Cudahy, Milwaukee county, to the Westinghouse-Church-Kerr Co., New York. It will be six stories high, 100 x 400 feet. Byron C. Dowse is president.

The Millers Falls Co., Millers Falls, Mass., is erecting a two-story building with basement, 250 x 60 feet, which will be used almost entirely for packing, storing and shipping finished goods and for making paper boxes. Nearly all contracts for equipment have been let.

The Martin Dennis Co., manufacturer of chemicals, 859 Summer avenue, Newark, N. J., will build a two-story fireproof extension to its factory. The building will be 65 x 126 feet, of brick and concrete, and is estimated to cost \$26,000. The present boiler house is to be enlarged.

The American Building Foundry Co., John C. Roubik, proprietor, 1338 West Twenty-second street, Chicago, expects to build a new gray iron foundry with a capacity of 25 tons daily, sometime within the next six months. The plant will be arranged especially for handling architectural work and will be newly equipped.

The Youngstown Sheet & Tube Co. has awarded contracts for changing the channel of the Mahoning river south of the Pennsylvania railroad right-of-way in order to enlarge the site for increased mill capacity, which will be added the coming year. Much of the machinery for these improvements has been ordered.

Charles R. Speers, president of the A. E. Shorthill Co., Marshalltown, Ia., advises that this concern is going to move its plant from Marshalltown to Perry, Ia., where it will build extensive new shops. There will be a main fabricating building, 120 x 300 feet; a foundry, 60 x 140 feet, and a drop forge department, 50 x 100 feet. The company manufactures

boilers and engages in the general structural and fabricating business.

The Penn Motor Works' plant building, at New Castle, Pa., has advanced in construction work on its plant to the point where machinery soon will be installed, and within a week an amount of equipment will be moved from the temporary works in Pittsburgh. The company is backed largely by Pittsburgh and New Castle men.

The Nimmo Fence & Wire Goods Co., Cincinnati, will erect a factory at Oakley, a suburb of that city, to cost \$45,000. The building will be 90 x 140 feet, two stories. In a short time two other buildings about the same size will be added. The company is at present operating a factory in Linwood, Cincinnati.

The American Car & Ship Hardware Co., New Castle, Pa., is planning an immediate extension to its plant, and will, through rights given by the city, close a blind street and cover it with additional buildings as well as rebuild the main buildings of the plant. The company manufactures among other things aluminum bodies for automobiles.

The Randall-Faichney Co., Boston, manufacturer of surgical and dental specialties and automobile accessories, advises that it commenced work on April 15 on the erection of a new four-story factory building, 60 x 250 feet, located in Jamaica Plain. The structure is to be of reinforced concrete, with wooden floors laid on concrete. It will be provided with hot water heating and will be equipped with freight and passenger elevators. It is to be ready for occupancy by Aug. 15. The company is purchasing a large amount of machinery, most of which has already been provided for.

The Macomber & Whyte Rope Co., a Wisconsin corporation formed incidental to the establishment of a new wire rope and cable plant at Kenosha, Wis., has elected officers as follows: President, George S. Whyte; vice president and secretary, F. B. Macomber; treasurer, J. W. Johnston. Mr. Whyte will be general manager of the plant at Kenosha, and Mr. Macomber and Mr. Johnston will have charge of sales, with headquarters in Chicago. The company has started the work of moving its equipment from Coal City, Ill., to Kenosha, and the new plant will be in full operation by the middle of June. The new buildings are of brick and concrete construction, the main building having dimensions of 500 x 100 feet.



New Buyers

(In order to assist the post office in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

The following manufacturing companies have filed articles of incorporation:

Farrar Pump & Machinery Co., St. Louis; \$7,200; by J. P. Sweeney, Christy M. Farrar and A. V. Jennings.

Virginia Ore Co., Staunton, Va.; \$50,000; by president, Charles Catlett; vice president-secretary-treasurer, L. W. H. Peyton.

Trumbull Steel Co., Warren, O.; \$1,000,000; metals and minerals; by Jonathan Warner, W. T. Hardesty, William H. B. Ward, D. W. Kerr, John T. Harrington.

East St. Louis Bridge Co., East St. Louis, Ill.; \$125,000; to manufacture structural iron work; by Edwin A. Curtis, George B. Curtis, Robert P. Munger.

The Dayton Fare Recorder Co., Dayton, O.; \$500,000; to manufacture fare recorders and operating mechanisms and kindred devices; by Will I. Ohmer, Arthur C. Mitten, Oscar M. Gottschall, David B. Whistler, Earl H. Turner.

General Industrial

The Foott Machinery Co., Portland, Ore., has increased its capital stock from \$10,000 to \$50,000.

The Republic Metal & Rubber Co., St. Louis, has increased its capital stock from \$5,000 to \$20,000.

The Belden Engineering Co. has filed notice of an increase in capital stock from \$25,000 to \$50,000.

The Weiner Well & Machinery Co., Weiner, Ark., has surrendered its charter.

The Oneida Foundry Co., which is building a plant at Oneida, N. Y., expects to begin operating within five weeks.

The William B. Pollock Co., of Youngstown, O., has received a contract for a steel pipe line several miles long for the Georgia Gas & Power Co., at Tallulah Falls, Ga.

The H. K. B. Aero Engine Co. has been incorporated at San Francisco to build rotary aviation engines. Capital stock is \$25,000. Directors are

C. E. Kelsey, S. Hiller and S. B. Wright.

The Manitowoc Ship Building & Dry Dock Co. has just completed and launched a large sandsucker for the Heisler Sand Co., of Chicago. It is the largest ever built at the Manitowoc, Wis., yards.

A patented machine will be marketed by the Economy Bag Closing Co., which has been formed in Knoxville, Tenn., with \$10,000 capital stock by J. E. Miller, J. Allen Smith, H. A. Goforth and others.

The Dreis & Krump Mfg. Co., Halsted and Twenty-ninth streets, Chicago, has established a branch factory at Chatham, Ont., Can. The growth of business in Canada has necessitated this addition.

The Birmingham Tool & Implement Co. has been incorporated with a capital stock of \$65,000. The company will manufacture hay presses and agricultural implements in North Birmingham, Ala.

The Federal Steel Foundries Co., Chester, Pa., has received an order for steel plates from the Bethlehem Steel Co., the plates to be used in the construction of a warship at Cramp's shipyard, in Philadelphia.

The R. L. Barnes Safe & Lock Co., Richmond, Va., in reference to a report that it will rebuild its plant recently damaged by fire, advises that its plans for the future have not yet matured.

The Carbo Steel Post Co., successor to the American Steel Post Co., Los Angeles, Cal., has moved its main offices and plant to Chicago Heights, Ill. The company manufactures fence posts and short poles of all kinds.

The Frank Toomey Machine Co., 127 North Third street, Philadelphia, has purchased the entire stock of the Milton Foundry & Machine Co. and the Renewal Trolley Wheel Co., both of Milton, Pa.

The Westhouse Machine Co. has filed a notice in Harrisburg of an increase in the indebtedness of the corporation from \$865,000 to \$1,135,000. This notice is in line with the refinancing of that corporation.

C. B. Porter & Co., Philadelphia, manufacturers of tinware, advise that their recent incorporation will not be followed by any material changes

in business. The same policy and management will be continued.

The Atlas Coal Co., Burgettstown, Pa., has given a contract to the Pittsburgh Coal Washer Co. for a tippie of steel construction with a capacity of 4,000 tons of coal daily for the new mine at Burgettstown.

The Earle Gear & Machine Co., Philadelphia, has purchased a two-story factory on the northeast side of Stenton avenue, 155 feet south of Loudon street, for a nominal consideration, subject to a mortgage of \$20,000. The plat is 135 x 280 feet.

The Geo. F. Shevlin Mfg. Co., Saratoga Springs, N. Y., recently incorporated, advises that the future plans of the company, the nature of its output, and building to be done are undecided, but it is hoped to have specific plans ready at a later date.

The capital of the Peoples' Water & Light Co., Harrisburg, Ill., has been increased from \$50,000 to \$100,000. The additional funds will be used for extensions. J. P. Cravath, 1160 Old Colony building, Chicago, is general manager.

The Brier Hill Steel Co., Youngstown, O., has placed orders with the General Electric Co. for motor equipment for the new open-hearth steel plant for which Julian Kennedy, of Pittsburgh, is the consulting engineer.

The Hecla Iron Works, Brooklyn, N. Y., was awarded the contract for ornamental iron work in the dome of the state capitol at Madison, Wis. The Modern Steel Structural Co. has the contract for the structural steel work, now well under way.

The Pittsburgh Piping & Equipment Co., Pittsburgh, has awarded a contract for a steel and corrugated iron machine and pipe shop and storage building to be added to its plant in Smallman street, Pittsburgh, at a cost of \$14,000.

The Wausau Iron Works, Wausau, Wis., has broken ground for an addition, 100 x 200 feet, one story high, giving it a total of 40,000 square feet of floor space. It will be of steel construction. An electric crane will be installed. The company manufactures structural material, bridges, etc.

By order of Norris D. Powell, receiver for the Chester Engineering &

Machinery Co., the buildings and entire equipment will be sold at auction on May 7, at the plant, Delaware river, foot of Penn street, Chester, Pa. This includes patterns, jigs, motors, etc.

The W. C. Akins Machine Co., Rochester, N. Y., has been incorporated with a capital stock of \$10,000, and will make and repair all kinds of machines. Directors named for one year are Arthur Warren, William C. Akins, Elizabeth G. Akins and Katherine Vetter, all of Rochester.

The old foundry and steel plant of Stanley G. Flagg & Co., comprising the block bounded by Pennsylvania avenue, Hamilton, Nineteenth and Opal streets, has been sold for \$200,000 to Robinson & Crawford, for a grocery warehouse, in connection with a chain of retail stores.

The Sheboygan Machine Co. has been organized at Sheboygan, Wis., by L. Nelson, F. A. Karste and Charles Kummer to establish and operate a machine and engine works. The company is capitalized at \$10,000 and incorporated under the laws of Wisconsin.

The William Sellers Co., Philadelphia, finding itself more and more cramped every year in its quarters at Sixteenth street and Pennsylvania avenue, has purchased a tract of 46 acres at Folsom station, Delaware county, to which it will eventually remove its plant. No removal is immediately contemplated, however.

The Vigo Mfg. Co., Terre Haute, Ind., successor to the Trebert Gas Engine Co., advises that it has been formed for the purpose of manufacturing the Bullis automatic sanitary popcorn machine. The company has its buildings all completed and in use and has also its equipment of machinery, tools, etc.

The Basic Mineral Co. advises that the factory it is just starting is located in Springfield, O., on the New York Central lines. The Pittsburgh office and factory will be continued. The change was made to simplify railroad facilities because the company's business is scattered and the railroad rates are so great.

The Paxton-Mitchell Co., Omaha, Neb., manufacturer of metallic packing, will move from its present quarters at Twentieth and Harney streets, May 15, and start a \$50,000 foundry for the manufacture of brass, bronze and aluminum castings in the quarters at Twenty-seventh and Martha streets.

The G. E. Prentice Mfg. Co., New Britain, Conn., reports that it has made its initial purchase of shapers, lathes, drill presses, power presses,

eyelet machines, wire forming machines and drop presses, in connection with an extension to its plant. Other machine purchases probably will be made at a later date.

The Atlanta Steel Co., Atlanta, Ga., will soon add to its power facilities by the installation of a large 1,600-horsepower induction motor in its new rolling mill. The motor is to be of the heavy mill type construction, will be direct connected by gearing and has primary oil switch control and secondary current limit control. This apparatus is being obtained from the General Electric Co.

The Gulick-Henderson Co., inspecting engineer, chemist, assayer and metallurgist, has opened larger quarters for its offices, laboratories and testing rooms in Pittsburgh, at 525 to 529 Third avenue. The company's business has grown rapidly and a large amount of new machinery and apparatus has been installed. The San Francisco office of this company is located at 444 Market street.

The Grand Trunk Railway Co. has signed a three-year agreement with its locomotive engineers by which their wages are increased between 9 and 11 per cent. The increase dates from April 1 and applies to the whole system in Canada and the United States. An advance in the wages of freight handlers and checkers is also announced. Negotiations are now in progress with the firemen for a three-year agreement.

The Racine-Truscott-Shell Lake Boat Co. has been incorporated as a Wisconsin corporation, with headquarters at Shell Lake, Wis., to take over and operate the three boat and engine plants at Muskegon, Mich., St. Joseph, Mich., and Shell Lake, Wis., which formerly were members of the United Boat & Engine Co. The new corporation is capitalized at \$1,000,000. J. M. Smith, Shell Lake, is president.

The American Steel Tire Co. has been organized at Milwaukee, Wis., with a capital stock of \$50,000, to manufacture an invention of Clifford L. Butler, of Milwaukee. The officers are: President, Clifford L. Butler; vice president, H. G. Whiteway; secretary and treasurer, Louis B. Montfort. Samuel W. Heath will be chief engineer. The American steel tire is built for the ordinary quick detachable rim.

The stockholders of the Kelly Reamer Co., Cleveland, have elected the following directors for the ensuing year: William E. Kelly, W. A. Calhoun, H. J. Maxwell, O. H. P. Davis, E. B. Jessup, George Bauer and Thomas A. Torrance. The directors

organized as follows: President and general manager, William E. Kelly; vice president, W. A. Calhoun; secretary, H. J. Maxwell; treasurer, O. H. P. Davis. The company reports a large increase in business during the year.

The Manistee Iron Works Co., Manistee, Mich., in explaining published reports that it had reduced its capital stock from \$800,000 to \$300,000, says that it decided recently to increase its capital stock from \$25,000 to \$800,000 for the purpose of increasing its business and purchasing certain patent rights. It, however, did not do this, although registered to do so. It eventually increased to \$300,000 and issued bonds for a further \$200,000, so that it really increased its capital stock from \$25,000 to \$300,000.

The Des Moines Structural Steel Works, Des Moines, Ia., has been incorporated with a capital stock of \$25,000. The company has been a co-partnership. Officers of the corporation are: President, George W. Newell; vice president, L. H. Hixson; secretary and treasurer, R. C. Powell. Others interested are E. C. Gilbert and William O. Walker. Mr. Newell will be general manager of the company, Mr. Powell will be chief engineer, Mr. Gilbert will be contracting engineer and Mr. Walker will be in charge of the books and accounting department.

Trade Notes

The Cambria Steel Co. has moved its Chicago office from the Western Union building, to 1860 McCormick building, Michigan avenue and Van Buren street.

The Interstate Steel & Supply Co., Pittsburgh, now a co-partnership, has applied for a charter under the same name, with C. T. Herron, E. Clay Young and Harry K. Duff as incorporators. The company does a general machinery supply business.

Among the Wisconsin employers who have elected to come under the provisions of the workmen's compensation act within the last few days are the S. Freeman & Sons Mfg. Co., Racine; the Janesville Machine Co., Janesville; the American Brass Co., Kenosha branch, and the Modern Steel Structural Co., Waukesha.

Fires

The Pittsburgh Foundry & Machine Co.'s plant at Salem, O., was badly damaged by fire April 30. The loss is estimated at \$8,000.